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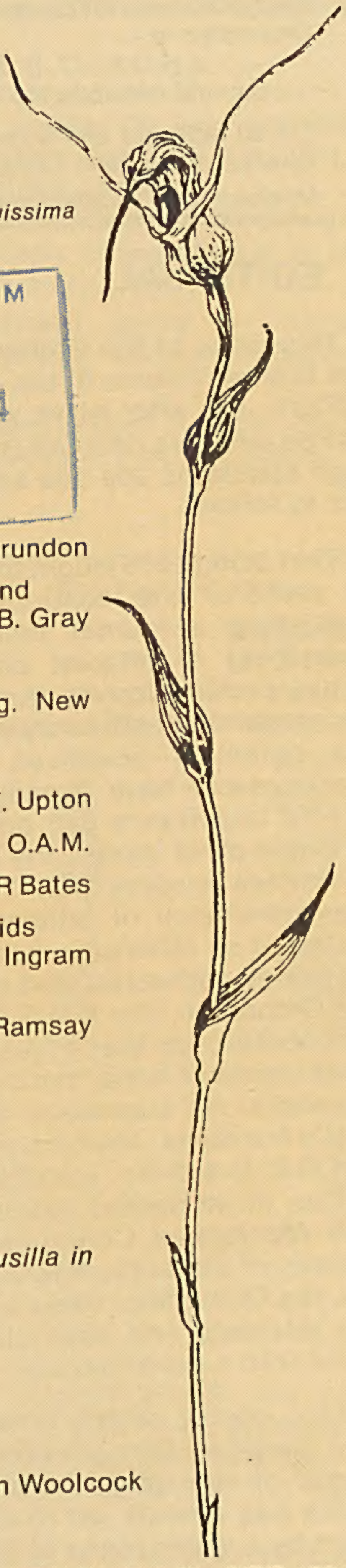
The Orchadian

Volume 8, No. 1 September 1984

Dedicated to the study and care of
Australasian indigenous orchids.



Pterostylis tennuissima

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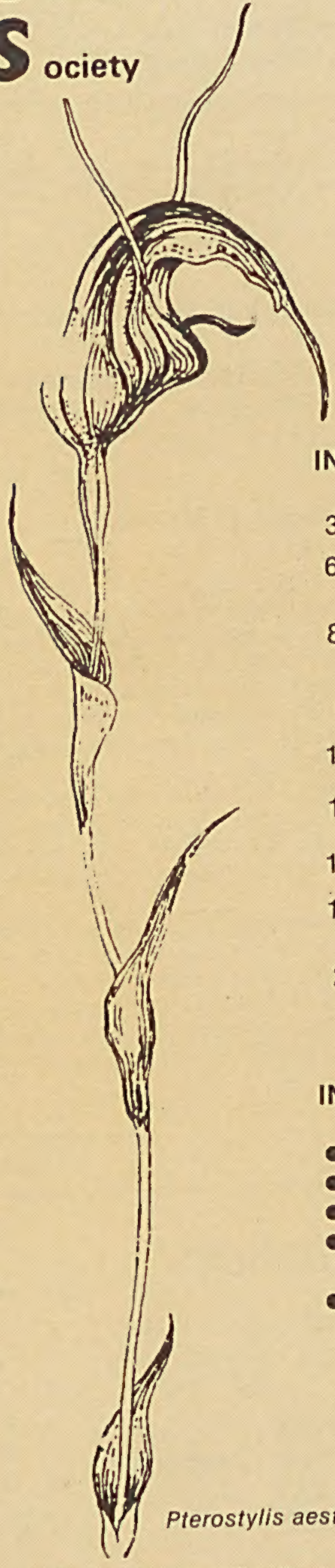

Pterostylis aestiva

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EDITORIAL

This issue of the Orchadian will be not only the first of Volume 8, but the first for the new editors. Joe, after seven years at the task, has retired, and it is only fair to say, because of the high standards Joe has set, he will be a "hard act to follow".

That being so, though, the new editors intend to preserve the continuity of 21 years of publishing a journal that strives to impart something of interest and relevance to all native orchid growers throughout Australasia and maintain itself as a publication of value to the botanical world as a whole. As our predecessors have already said, such a position of importance can only be maintained if, amongst other things, the quality and quantity of articles remains high. To that end we invite the submission of articles, of any length, illustrated or otherwise from amateur and professional, enthusiast and researcher. After all, the Orchadian, like A.N.O.S. itself, is not a distant abstraction that arises through the agency of an unknown hand, but is an expression of it's members; it's successes or failures are those of it's members. The relevance and standing of A.N.O.S. is a direct function of the will and activities of interested native orchid growers all over Australasia. Constrained as we are by the tyranny of distance, A.N.O.S., through it's journal, the Orchadian, seeks to be the nexus of all our interests and aspirations, weaving these same into a commonweal.

Also retiring at this time is Norman Hilliger who presided over an exciting and important period of change in the structure of A.N.O.S. which has already led to enthusiastic involvement by a wider circle of A.N.O.S. Groups and paves the way for further advancement towards the aims of A.N.O.S.

The wider interest of Groups is indicated by the fact that our new President, Roy Gifford, comes from A.N.O.S. Central Coast Group.

ANOS Annual General Meeting

"Ladies and Gentlemen,

"Welcome to the 21st Annual General Meeting. In an eventful year we have finally achieved colour in the Orchadian. The last 3 issues have been well received by members but it is proving a very costly exercise. If we are to keep colour we need a dramatic increase in membership. I call on all Groups and individual members to endeavour to introduce new members to the Society.

"In July a Workshop was held celebrating the 21st Anniversary of A.N.O.S. It was thoroughly enjoyed by the participants, making new friends and meeting old ones. The disappointing thing was the lack of support by members of A.N.O.S.

"This meeting sees the retirement of Joe Betts from the position of Editor, a position he has capably fulfilled, and from all members I say 'Thanks Joe — a job well done'.

"This is also my last term as President and I wish to thank all members of the Executive Council for their support especially Mike Harrison for being the best Secretary any President could wish to have."

Norman Hilliger
President

NEW ADDRESS

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FEEDING OUR NATIVE ORCHIDS

by Noel J. Grundon

Orchids are plants and have the same general requirements as all other plants. To grow and flower, they must receive the basic necessities of life. For a mement, imagine yourself as an orchid growing happily in the bush or in a well-run nursery. Along comes a native orchid grower and you are torn from your happy home and transported in triumph to your new home. You look around to see if everything is to your liking. The light is right; not too bright and not too dull. Just the right amount of breeze to provide fresh air. Regular waterings keep you cool and the compost moist but not damp. Temperatures are just right for growing. OK then, let's grow! But what's to eat? What's on the fertilizer menu?

I am sure that most growers would agree on the amount of light, air and water and the temperature needed for good growth of our natives. But I am also sure that if there are ten growers at a meeting there will be eleven different methods of feeding our natives. It seems every grower has his or her own method of providing the mineral food that their plants must have to grow and thrive.

The methods will range from applying fertilizers every watering to NEVER adding any fertilizer. But all growers will have won championships with their plants and all will have observed four rules. They will have:

1. Supplied the correct mineral nutrients;
2. Supplied them in the correct amounts;
3. Supplied them in the correct forms; and
4. Supplied them when the plants needed them.

The Correct Nutrients

What is the food that orchids need? Unfortunately, no scientific studies have been made of the nutrients our natives need to remain healthy. But orchids are plants and we can assume that they need the same food as all other plants.

The Greek Philosopher, Aristotle (384 - 322 B.C.), considered that all matter was made up of water, air, earth and fire. This view of the composition of living plants prevailed for 2,000 years until a Belgian physician, J.B. von Helmont (1577 - 1644), planted a 2.3 kg willow cutting in 90.7 kg of dry soil. After 5 years with the addition of only rain or distilled water, the willow cutting weighed 79 kg. When von Helmont reweighed the soil he fould a weight loss of about 60 g. He attributed this weight loss to error and concluded that "79 kg of wood, bark and root had arisen from the water alone".

Today, we know that all plants are made of elements which they obtain from the air, water and soil or compost. From the air and water they obtain the elements carbon (C), oxygen (O) and hydrogen (H). The weight loss of the soil which von Helmont dismissed as an error represented the mineral elements that all plants need. These elements are nitrogen (N), potassium (K), phosphorus (P), calcium (Ca), magnesium (Mg), sulphur (S), iron (Fe), chloride (Cl), boron (B), manganese (Mn), zinc (Zn), copper (Cu) and molybdenum (Mo).

The elements are divided into the two groups on the basis of their concentration in plants (Table 1). Thus we have:

The macronutrient group — nitrogen, potassium, phosporus, calcium, magnesium and sulphur; and

the micronutrient group — iron, chlorine, boron, manganese, zinc, copper and molybdenum.

TABLE 1. Approximate concentrations of nutrient elements required for healthy plant growth.

		Concentration in dry matter
Element	**Percent (%)**	**Parts Per Million (PPM)**
Oxygen	48.0	480,000
Carbon	42.0	420,000
Hydrogen	6.0	60,000
Nitrogen	1.4	14,000
Potassium	1.0	10,000
Calcium	0.5	5,000
Magnesium	0.2	2,000
Phosphorus	0.2	2,000
Sulphur	0.1	1,000
Iron	-	100
Chlorine	-	100
Manganese	-	50
Boron	-	20
Zinc	-	20
Copper	-	6
Molybdenum	-	0.1

However, the macronutrients are of no greater importance to plants just because they are required in the largest amounts. All elements are equally important for healthy growth.

Although almost 96% of all plants are made up of carbon, hydrogen and oxygen, we will not consider these here. We are interested in the remaining 12 elements which we call the mineral nutrients.

The Correct Amounts.

Although Table 1 shows the approximate composition of the "average" plant, this does not mean that all plants or orchids contain exactly those amounts of each nutrient. Some species contain more while others contain less. Young shoots have higher concentrations that old mature shoots.

The data of Table 1 are best thought of as a guide to the relative proportions of each nutrient required by orchids. Thus, we must supply about one and a half times as much nitrogen as potassium, about three times as much nitrogen as calcium, about seven times as much nitrogen as phosphorus, about 140 times as much nitrogen as iron, about 140,000 times as much nitrogen as molybdenum, and so on.

The amount of growth your plants can produce will be directly related to the amount of nutrients you supply. Plants supplied with insufficient nutrients suffer from nutrient deficiency and will not produce their maximum growth. If you supply far too much of any nutrient, plants may take up very much more than they need and the nutrient may reach concentrations in the tissues which are too toxic for healthy growth. When this occurs, growth will be depressed and the new shoot or whole plant may die if the nutrient becomes too toxic.

The correct amount of nutrient is sufficient to be above the deficient level and below the toxic level. For most nutrients there is a wide range between deficient and toxic amounts. However, be very careful with boron, zinc, copper and manganese where the difference between deficiency and toxicity is very narrow and it is easy to add too much.

The Correct Forms

Orchids are unable to take in solid foods. This is an obvious statement known to everybody. So why do so many people ignore its importance.

The mineral nutrients that orchids take in must be dissolved in water. Composts must be kept moist if orchids are to have any chance of taking in their food. Solid fertilizers must be given a chance to dissolve before they are of any value to orchids. In organic materials such as blood and bone, Nitrosol and Fish Emulsion, the nutrient elements occur in insoluble organic compounds which orchids can not take in. These organic compounds must be decomposed and broken down to their nutrient elements before orchids can use them.

When dissolved in water, the nutrient elements occur as ions. Thus, magnesium sulphate dissolves in water to form magnesium ions and sulphate ions. The magnesium ion carries two positive electrical charges while the sulphate ion carries two negative electrical charges. The plant absorbs magnesium as the magnesium ion and sulphur as part of the sulphate ion. Table 2 shows the form in which each mineral nutrient is taken up by orchids.

So when you wish to supply a quick boost to your plants, use a soluble fertilizer and keep the compost moist. If you want to supply a delayed release of nutrients, use an organic fertilizer which must be decomposed first before it makes its nutrients available to the plant.

TABLE 2. Ionic forms in which nutrient elements are taken up by plants.

Cations (Positive charge)		Anions (Negative charge)	
Element	**Ionic form**	**Element**	**Ionic form**
Nitrogen	$\mathrm{NH4}^{\$}$	Nitrogen	$\mathrm{N03}^{\prime}$
Potassium	$\mathrm{K}^{\$}$	Phosphorus	$\mathrm{H2P04}^{\prime}$; $\mathrm{HP04}^{\$}$
Calcium	$\mathrm{Ca}^{\$\$}$	Sulphur	$\mathrm{S04}^{\$}$
Magnesium	$\mathrm{Mg}^{\$\$}$	Boron	$\mathrm{B03}^{\prime}$
Iron	$\mathrm{Fe}^{\$\$}$	Molybdenum	$\mathrm{Mo04}^{\prime}$
Manganese	$\mathrm{Mn}^{\$\$}$	Chlorine	$\mathrm{Cl}^{\prime}$
Zinc	$\mathrm{Zn}^{\$\$}$		
Copper	$\mathrm{Cu}^{\$\$}$		

The Correct Time

Orchids use the nutrients to produce roots, stems, leaves and flowers. Therefore they need nutrients only when they are growing. So apply your fertilizers only when the orchid is in active growth. You will recognise this stage by the production of new roots or new shoots. Application of fertilizers when the orchid is resting is a waste of your money.

Source of Mineral Nutrients

Fertilizers are an obvious source of mineral nutrients. Many forms are available, ranging from inorganic salts which supply one or two mineral nutrients to "complete" fertilizers made up of many inorganic salts or organic compounds.

When you purchase your fertilizer, know what you are buying — READ THE LABEL. Look for the ratio which shows the proportion of nitrogen to phosphorus to potassium. Thus a 10:5:8 ratio means the fertilizer supplies 10% nitrogen, 5% phosphorus and 8% potassium. Choose the ratio which best suits your orchids. When many new young shoots are being produced, choose a fertilizer with a higher ratio of nitrogen to the other nutrients. When the shoots are maturing, less nitrogen is needed and a fertilizer with a lower ratio of nitrogen and higher ratio of phosphorus and potassium is better.

Many people forget about two very important sources of nutrients; the water they apply and the compost they use to hold the plant up. All natural waters contain some, if not all, of the nutrients orchids need. The amounts may be quite small and not enough for healthy growth, but sometimes they may occur in toxic quantities. If you are concerned about how much nutrients your water contains, have it analysed.

The compost can supply some of the nutrients orchids need. Between the water and the compost, your orchid will be supplied with all of its micronutrient requirements. I can see no justification in feeding micronutrients unless you know your water supply comes from catchment areas where trace element deficiencies occur naturally in the soil.

If you use a compost which has little organic material and contains mainly inert compounds such as washed sand, gravel, perlite or vermiculite, you will need to supply all the macronutrients and perhaps iron. If you use a mainly organic mix, less fertilizer may be needed, but you will have to use a high nitrogen ratio fertilizer to provide the extra nitrogen needed by microbes as they decompose the organic materials to make these nutrients available to your orchid.

Fertilizer Recommendations

I know many people have waited patiently for me to give some magic formula which will make their orchids thrive. I am sorry to disappoint you, but it is impossible to give one formula which will work for everyone. Remember the fellow who has NEVER added fertilizers? I bet he has a fairly organic mix as a compost or the water he uses has large amounts of naturally occuring nutrients.

Many people have successfully tried the formula suggested by W.R. Johnson. This formula is based on his own experience and on scientific studies undertaken by Poole and Seeley in U.S.A. If you are using this formula, be aware that Poole and Seeley used a compost of glass beads which would provide no nutrients. Further-more, they supplied their nutrients every day and so needed to use only a dilute solution of the fertilizer chemicals. I prefer this approach to fertilizer application; A LITTLE FERTILIZER OFTEN rather than a big gulp once a month or so.

I would recommend Johnson's formula to you but if you wish to try another, Table 3 shows one I have found to be useful for Toowoomba's climate and a compost based on pinebark, perlite and gravel.

TABLE 3. Fertilizing programme for orchids.

A Use tank water or good quality well, bore or stream water to make up the fertilizing solution.
B Feed regularly; each week or twice per week.
C Water heavily once per month to remove excess salts from the compost.
D Make up the fertilizer solution as follows:

	Grams per 200 litres		
Fertilizer	**Small seedlings**	**Sub-adult Plants**	**Adult Plants**
Monoammonium phosphate (MAP)	2	5	10
Potassium nitrate	12	30	60
Calcium nitrate	20	50	100
Magnesium sulphate	10	25	50
Iron chelate (FeEDTA)	0.6	3	6

Conclusions

Successful growth of native orchids depends, amongst other things, on supplying the mineral nutrients nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, iron, chlorine, boron, manganese, zinc, copper and molybdenum. All nutrients must be supplied during the active growth phase of the plant, in forms which plants can use and in amounts sufficient to satisfy the growth requirements of the plant. The amounts needed will be affected by the type of compost used and the purity of the water supply. There is no formula which can be applied universally to all growers but that suggested by W.R. Johnson is a good point from which to start your own experiments.

Noel J. Grundon,
4 Jean Street,
Toowoomba
Qld. 4350.

Editorial Footnote

W.R. Johnson's report entitled *"A Simple Liquid Nutritional Program for Orchids"* resulted from a study made over a period of four years. It has been available from The Australian Orchid Foundation and is worthy of detailed study by our readers.

Briefly the simple formulation comprises Hortico's Aquasol, Chelated Iron and magnesium sulphate. These three ingredients must be mixed in the correct proportions to achieve a rebalancing of the Aquasol for use with orchids — including Australian native dendrobiums. The report is thorough, with an Addendum on potting mixes, pot temperatures, roofing material, N.P.K. ratios, etc. Some unexpected results of the study are: that *larger pots* (not the gradual and regular increase in pot size) give a better growth rate; and that 5 years testing of green fibreglass roofing showed it to be better than clear fibreglass for all commonly grown orchid genera.

A new species of *Malaxis* from North Queensland

by P.S. Lavarack * and B. Gray **

Diagnosis:

***Malaxis lawleri* Lavarack et B. Gray sp. nov. similis *M. warianae* (Schltr) P.F. Hunt, sed foliis parvioribus (2.5-4 x 1-2 cm); labello dentibus 2 rel 3 utrinque apice et pedicello breviore (5 mm longo) differt.**

An erect deciduous terrestrial with the new shoot arising from the lower or mid nodes of the old stem. Pseudobulbs ovoid or elongated, 1.5-8.0 x 0.3-0.5 cm, often lying along the surface of the ground for a short distance, then erect. Roots few about 0.8 mm diameter. Leaves 4 or 5, petiolate; the lamina lanceolate, 2.5-4 x 1-2 cm, with 3 prominent veins; the petiole sheathing the stem, about 1-1.5 cm long. Inflorescence about 10 cm long, peduncle and rachis about the same length, peduncle about 1.5 mm diameter, with one or two bracts which are erect lying along the stem, 7 mm long; the rachis with 5-10 flowers, rather widely spaced. Floral bracts lanceolate, 3 x 1 mm, reflexed; pedicel, including ovary, about 5 mm long. Flowers about 6 mm diameter, greenish-cream, widely spreading. Dorsal sepal oblong 3-4 x 1 mm, tending to reflex. Lateral sepals linear, 3 x 0.5 mm, slightly falcate. Petals ovoid, 4 x 2 mm, spreading. Labellum uppermost, 4 x 4 mm, horse-shoe shaped; the apex prominently bifid and with two or three prominent teeth 0.5 mm long on each side; auricles about half the length of the labellum, bluntly triangular, reaching well above the column; a slight pouch near the base of the column. Column short, about 1 x 1 mm, with blunt wings protruding above the level of the anther. Stigma transverse, semicircular. Anther small, scutiform.

Typus. Cook District, near Rossville, 30 km south of Cooktown 15°45′S; 145°16′E, June 1984. BG 3378. (QRS, hylotypus).

Habitat. Margin of a Pandanus swamp at 200 m elevation. Shady; moist situation.

Taxonomy.

M. lawleri belongs to the section *Pleiodon* and appears to be closely related to several New Guinea species, perhaps most closely to *M. wariana* (Schltr.) P.F. Hunt. It differs from this species in the number and shape of the teeth on the labellum, having 2 or 3 teeth on eigher side of the apex, while *M. wariana* has 4; in the more robust column; in the pedicel which is only half the length of that in *M. wariana*; and in the generally smaller plant size.

In Australia it is related to *M. xanthochila* (Schltr.) Ames and Schweinf. and to *M. fimbriata* Lavarack, however both these species have longer inflorescences with numerous closely-packed flowers and numerous bracts on the peduncle, while *M. lawleri* has a short, sparse inflorescence with less than 10 flowers and only one or two bracts on the peduncle. There are other differences in the number and shape of the teeth on the labellum, and in the plant size. *M. lawleri* is clearly the smallest of the Australian species with leaves only one-third as long as the other native species.

The differences quoted above are admittedly small, but they are of the order used by Schlechter, J.J. Smith and others to separate several similar species. This section is in need of revision and if this were done, it is likely that several names would be reduced to synonymy. Allied to this, the lack of Schlechter hylotypes and, where they do exist, their poor quality, adds to the problems of the taxonomist in this group. Given this situation, and given that the species described here is distinct from all other Australian species and is at least as distinct as several New Guinea species, it was considered useful to describe this species as new, pending any future revision of the group.

Notes. This species was first collected by Len Lawler in 1966. He reports as follows: "I visited the swamp on 27th September and found four terrestrial orchids, *Phaius tancarvilliae, Spathoglottis* sp., *Zeuxine oblonga* and *Malaxis latifolia*. There was also a small plant, obviously a *Malaxis*, which was growing in a close colony of some twenty plants. A few were flowering and one had a green pod.

"The area was revisited in September of 1970, 1976 and 1978, in all cases the plants were flowering but the numbers appeared to have decreased. The swamp had been badly damaged by feral pigs."

Subsequent visits by Bruce Gray have revealed very few remaining plants and increasing damage by pigs. Almost certainly other populations exist, but to date none has come to light.

Acknowledgements

Our thanks are due to Len Lawler for making his specimens available and to Joe Betts for the Latin diagnosis.

***National Parks and Wildlife Service**
Townsville
****CSIRO, Division of Forest Research**
Atherton

24 August, 1984.

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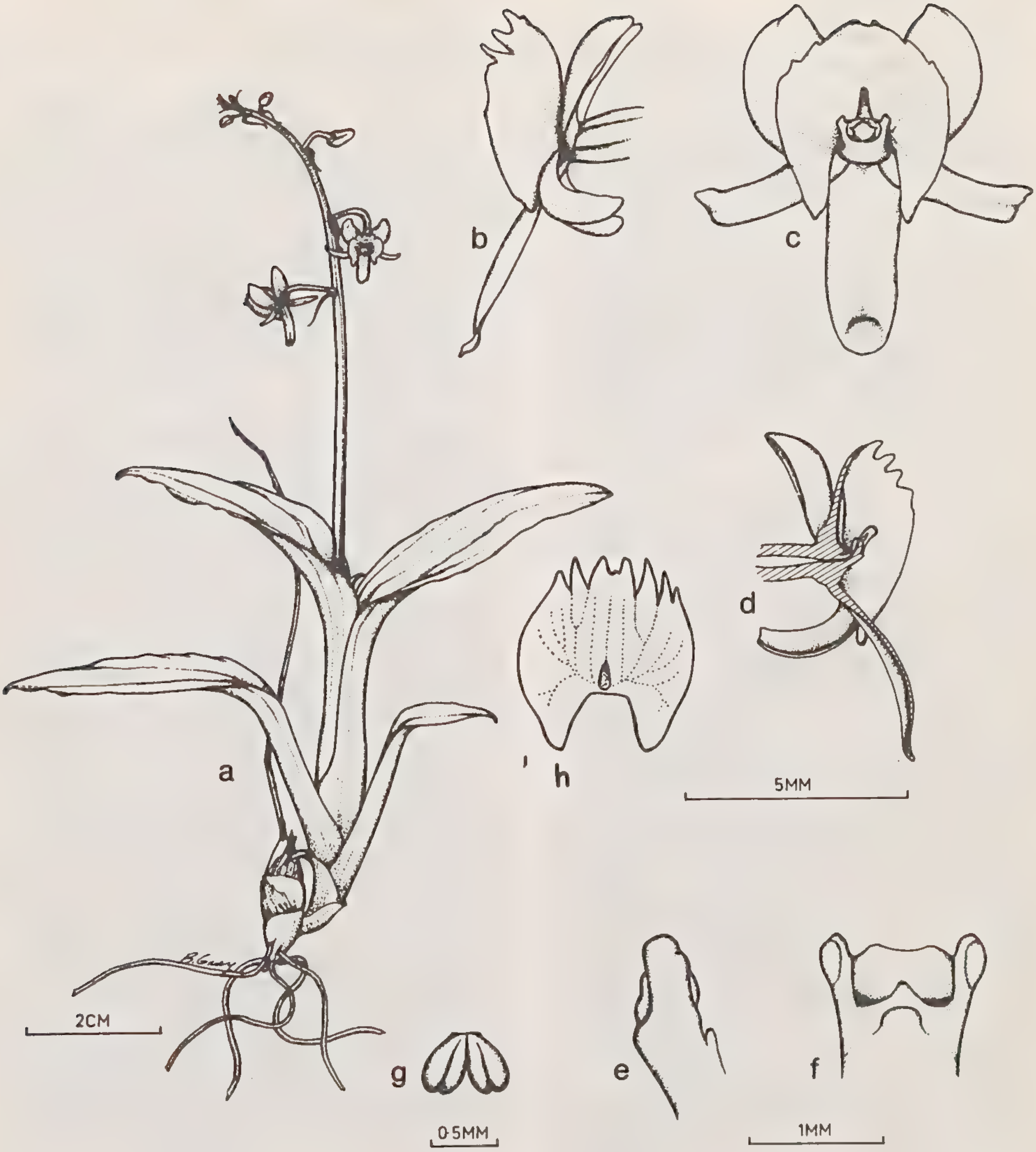


Drawing: Bruce Gray

Malaxis tawleri sp. nov.

a. Habit
b. Flower from the side
c. Flower from the front
d. Flower in section
e. Column from the side
f. Column from the front
g. Pollinia
h. Labellum, flattened out.
(All to indicated scales)

CONSERVATION

AUSTRALASIAN NATIVE ORCHID SOCIETY WORKSHOP

Paper presented by the National Parks and Wildlife Serivce of N.S.W. on conservation of native orchids and licensing of private growers and commercial pickers.

The National Parks and Wildlife Service is grateful for the opportunity to address this workshop of the Australasian Native Orchid Society on the conservation of native orchids and the licensing of private growers and commercial pickers.

The Service is very concerned about the taking of a number of species of native flora from the wild, including **all** species of native orchids. While the Service has special concerns about some of the less common and rarer orchids (*Sarcochilus fitzgeraldii* and *S. hartmanii* are just two examples), we are also concerned about the substantial harvesting of common species such as *Dendrobium kingianum* and *D. speciosium.* While there are still plenty of specimens of these species in the bush it is simply common sense that harvesting at existing rates cannot continue indefinitely.

The Service is distressed at the unsympathetic and wasteful marketing of many native orchids through large department stores. The Service is also very concerned about the actions of enthusiasts who are responsible for the illegal taking of rarer species from the wild. The nature conservation costs of these actions may well be greater than large scale harvesting for more commercially oriented purposes.

Sections of the National Parks and Wildlife Act, 1974, and the Native Plants Protection Regulations, 1975, provide the statutory basis for a licensing system, the aim of which is to control the exploitation of protected native plants. Although the system is workable in a theoretical sense, it is clear that it does not work very well in practice.

The National Parks and Wildlife Service is only too well aware of the system's shortcomings. I must be candid and say that the system does very little towards controlling exploitation of some types of protected native flora — notably orchids, tree ferns, stag horns, elk horns and birds nest ferns. It is not that the Service does not wish to effect proper controls; it is simply the Service does not have sufficient staff available to effectively operate this system.

The flaw in the system from a law enforcement point of view is that there is no point at which effective law enforcement oversight can be undertaken. It is obviously impractical to attempt to police the actual physical taking of plants from the wild. The regular inspection of hundreds of retail outlets is also difficult from the manpower angle. Regulation at this point in the commercial chain also brings into play problems associated with "breaking up" of plants and the free trade guarantees under Section 92 of the Federal Constitution.

This latter point is worth taking up. Section 92 guarantees free trade between the States. Very briefly if someone can claim to have legally obtained something in one State, he or she can possess it or trade it in another State, without undue hindrance so long as the laws of the second State are not broken. In effect, what happens is that, if an operator claims that specimens under suspicion of being taken illegally in New South Wales, were really taken legally from Queensland he or she has a defence under Section 92 which is difficult to overturn. Queensland is an appropriate example to use. No approvals to take native orchids off private property for sale are necessary in Queensland and other than that of the property owner. This situation is a useful cover for illegal operators in New South Wales and presents considerable difficulties for the New South Wales Service.

Another manpower oriented problem with the present system is that, in theory, properties should be inspected prior to the issue of a picker's licence. In practical terms this is an impossibility and would remain an impossibility even with substantially increased staff numbers.

In summary, the present system of regulation falls well short of being an effective controlling mechanism for the protection of wild stocks of protected native plants.

It is obvious that steps need to be taken to drastically improve this situation because of increasing pressures on wild stocks of many species of native plants. There are technical, practical and legal difficulties involved in coming up with solutions and these difficulties are substantial.

The Service has started to look at the issues involved. We have not as yet been able to progress a great distance but what I am able to do now is to give you an outline of some of our thinking. I have no doubt that you will find some of this interesting and innovative.

On the broader conservation front the Service has in mind putting a proposition to the Government for legislation to better protect endangered species of flora and fauna. The sort of format envisaged would enable the Service to fully protect specimens and habitats on private lands. If, for example, specimens of a very rare orchid turned up on a private property the Service would have the power to fully protect those specimens. Naturally enough, legislation of this nature would need to cover the matter of compensation to landowners, amongst other issues.

The Service also has in mind recommending to the Government legislation for what we have termed Conservation Agreements. This would enable the Service to enter into a formal contractual agreement with a landholder to conserve all or part of the landholder's property. The innovate part of the proposal is that the contract would be enforceable and would run with the title of the land. It would bind not only the contracting landowner but also future owners.

Both of these proposals are significant because they would effect protection of nominated species of plants on private lands. This would be important because to date native flora, unlike fauna, is real property and belongs to the person on whose land it is located.

The present legal mechanisms available to the Service have not proved themselves to be effective in protecting rare plants on private lands; the difficulties that the Service has had in attempting to protect specimens of the rare ground orchid *Pterostylis gibbosa* on the Illawarra illustrate this point.

The Council of Nature Conservation Ministers (comprising all Commonwealth/States nature conservation Ministers) has given consideration to a report which has put forward a model for uniform Australia-wide legislation. When implemented this will provide a legislative basis for overcoming many of the Section 92/interstate trade problems.

The Service has also started an overhaul of its plant licensing and tagging system. We need to balance the need to protect adequate wild stocks of native plants against a desire to encourage interest in our native flora and the understandable desire of many people to acquire examples of native plants. The key to this overhaul are the encouragement of propagation and the discouragement of taking from the wild.

The Service will be looking at restricting numbers of pickers, charging substantially higher licensing fees and charging fees for tags. The Service will also be looking at licensing retail outlets wishing to sell some species of native plants. The aim will be a much smaller and more tightly controlled commercial trade.

The Service, through liaison with the nursery industry, will be looking at ways of encouraging propagation by streamlining licensing procedures, keeping grower's licence fees low, providing stock from the wild for the propagation of domestic supplies of some rare species and encouraging and assisting, where possible, in the development of better propagation techniques.

We are also examining the prospect of prohibiting trade in some species of rare plants. At this point I would like to return to a comment that I made earlier in this paper. The taking and trading in small quantities of rare plants probably causes greater nature conservation damage than the much larger scale exploitation of more common. The market for the less common species is almost exclusively amongst enthusiasts. The taking and trading of some species is almost impossible for the Service to police particularly when they do not pass through the legal system.

It is not only up to the Service to attempt to redraw its procedures into a better format. Regulatory systems are necessary and can be very effective in controlling some unscrupulous operations, but they are not enough on their own.

It is also up to some enthusiasts and some enthusiasts' organisations to rethink their own practices and approaches to their hobby. It is also up to enthusiasts and their organisations to assist in the wider public education because, in the final wash-up, it is only by changing the attitudes and ignorance (and it is often ignorance rather than deliberate actions) of people and that of institutions such as Government authorities local councils etc. through education that we can really achieve effective broad scale conservation.

The National Parks and Wildlife Service would be very pleased to receive comments from ANOS, any of its constituent groups or private individuals on the points put forward in this paper, or on any other matter which might lead to the more effective conservation of our native flora.

Once again the Service is grateful for the opportunity of addressing the Workshop and wishes ANOS success for the Workshop.

CONSOLIDATED INDEX TO *THE ORCHADIAN*
Volumes 1-5

The Orchadian's first fifteen years (1963-1978) have been fully indexed by John S. Womersley, botanist, of Adelaide; and we are about to have the Consolidated Index typeset and printed. The cost to readers will be $5.00 (Australian) as notified in our September 1983 issue. That price includes postage charges within Australia. Orders from overseas should be accompanied by a bank draft payable in Australian dollars and must include an extra $2.00 to cover postage.

There has been a good response to our request for advance payments to facilitate our financing of the production costs; however the ANOS Hon. Treasurer strongly advises us all to make as many more advance orders as possible and as soon as possible. We wish to avoid printing too many copies in excess of immediate requirements. Please do not defer your decision and run the risk of disappointment later on.

Footnote:

This was presented at the recent ANOS workshop. The National Parks and Wildlife Service would welcome comments and/or suggestions from individuals or societies. Anybody interested should write direct to the Service at the following address:

National Parks and Wildlife Service
P.O. Box N189
Grosvenor St., Sydney N.S.W. 2000.
Attention Mr P. Brinsley or Dr K. Mullette

THE NEW HYBRIDS

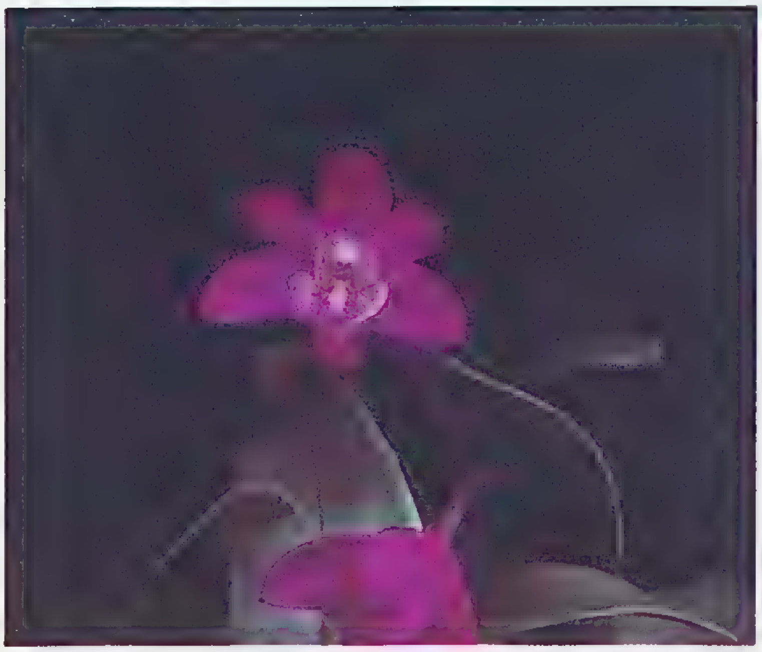


Fig 1 **Dendrobium Red Baron**

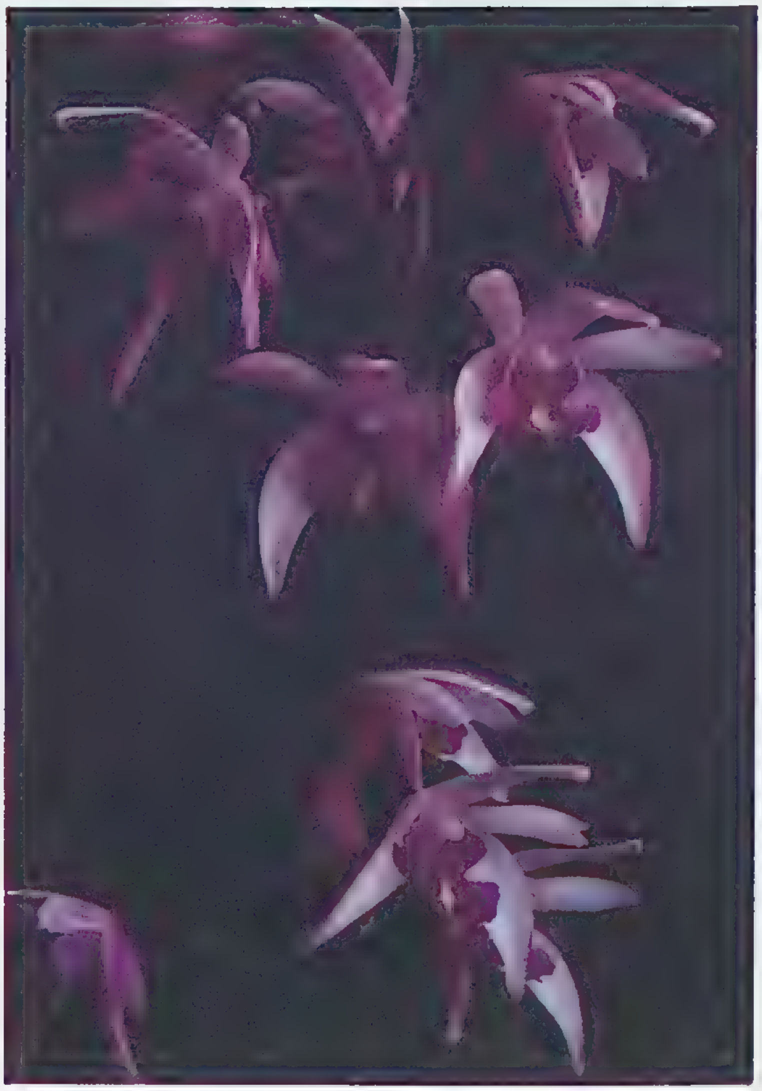


Fig 2 **Dendrobium Fiesta**

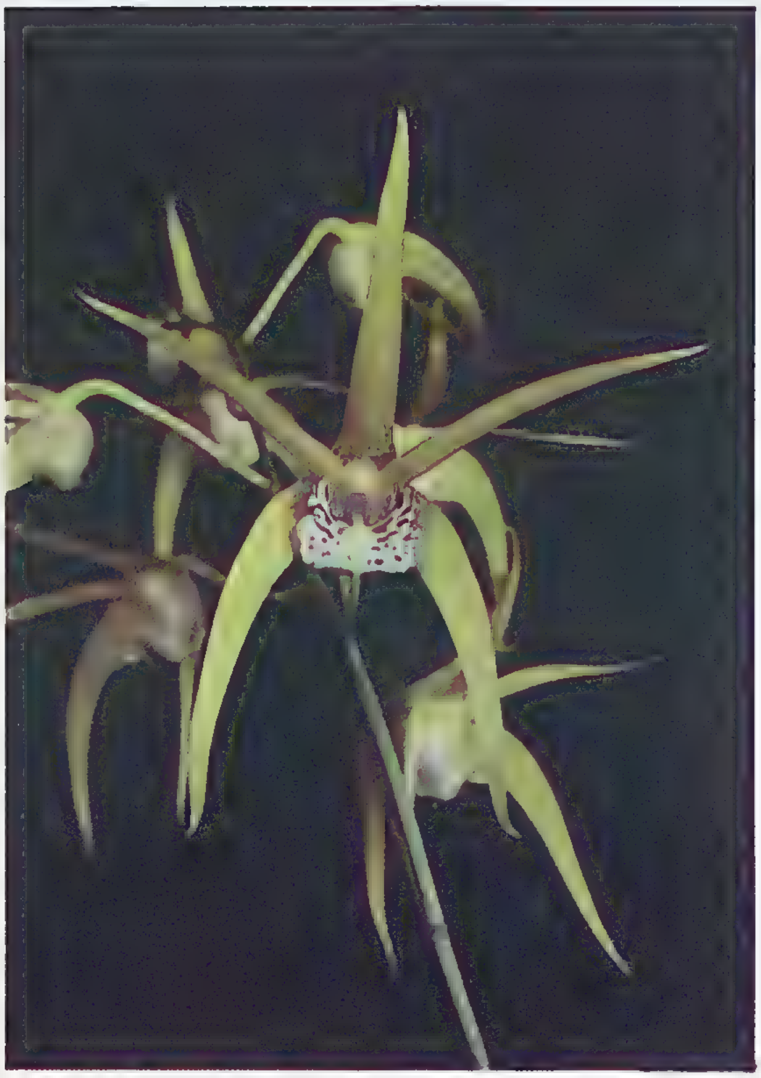


Fig 3 **Dendrobium Ira Butler**

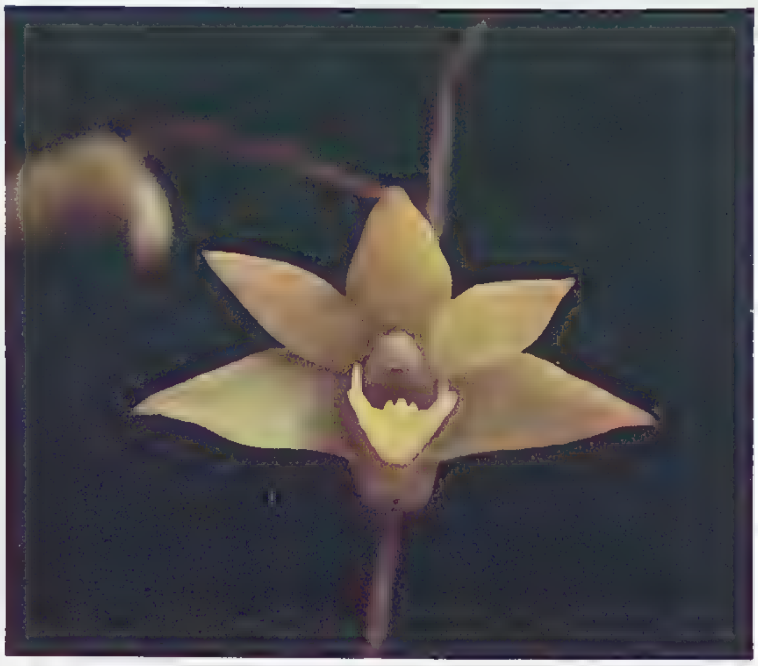


Fig 4 **Dendrobium Orana**

FOUR OF MY LATEST AUSTRALIAN NATIVE HYBRIDS

by W.T. Upton

In the March, 1984 issue, our Editor referred to four of my latest hybrids, suggesting that our September, 1984 issue should include an up to date coverage on hybrids and it should at least include *Dendrobium* Red Baron, *D.* Fiesta, *D.* Ira Butler and *D.* Orana. Well how do I get out of that? I do not, I just wish I had time so that more could be said on hybridising trends today. However, I will take up the challenge, or is it editorial blackmail, and tell you something about the four hybrids mentioned above.

The hardest thing about hybridising is finding a name for the hybrid. First one uses sons and daughters and then, grandchildrens' names. Running out of these, one tries to do the right thing, by using aboriginal words, but these can be difficult to pronounce. So one decides not to continue on these lines and the next two are named after the cat (D. Silvester) and the dog (D. Duke). We only have two animals, so what now? With the aid of my wife, we now look at a new hybrid and let it suggest a name to us.

Fig 1 *Dendrobium* Red Baron (*D.* Blushing Rose 'Jill' x *D. Kingianum* 'No. 10'). This one was easy to name. You can imagine the Red Baron sitting in the cockpit of his World War I 'plane with guns at the ready; and of course its red. The *D. kingianum* 'No. 10' is a good parent, particularly as the pollen parent. It always passes its intense colour on to its progeny. How important it is in hybridising to know one's parents (and in life too) and their dominent and recessive characteristics. Having three lots of *D. kingianum* in its parentage, this hybrid has few flowers, but this is made up for by its colour, apparently intensified by the yellow and red-brown markings in *D. gracilicaule. D. falcorostrum* has clearly rounded the segments. (D. Blushing Rose is D. Bardo Rose x *D. Xsuffusum.*) The next step is to increase the numbers of flowers and their size (3cm).

Fig 2 *Dendrobium* Fiesta (D. Colin x D. Kim) is named for a joyous occasion. D. Colin is D. Ellen x *D. ruppianum v. magnificum.* A very good and strongly marked D. Ellen was used with the result D. Colin is larger and the apical half of the segments was quite dark purple. It was very florific, thanks to *D. ruppianum v. magnificum.* The D. Kim (D. Peter x *D. kingianum*) has a very dark lip. The *D. falcorostrum* and *D. fleckeri* (the parents of D. Peter) did little, except possibly to improve the shape and lip, but then neither of the last two species are as dominant as *D. kingianum* and there are two helpings of *D. kingianum* in this hybrid. Quite a few plants flowered for the first time last September averaging twelve flowers per raceme. Very little influence of *D. tetragonum* can be seen although this species is usually very dominant for shape, except when used with *D. kingianum.* It has strong and upright racemes. The flowers are 4 - 5 cm in diameter.

Fig 3 *Dendrobium* Ira Butler. (D. Hilda Poxon x *D. ruppianum v. magnificum*) The name -this was Ira's type of hybridising and it had to be good to have his name on it. A well marked form of *D. Hilda Poxon* was used with my excellent and very large *D. ruppianum v. magnigicum,* but this year it already has 4 racemes with fourteen or more flowers on each of them. It had an upright raceme habit last year, maybe with the extra flowers it might have an arching raceme this year. The lip is its most dominant feature, no doubt a *D. ruppianum* lip complimented with the *D. tetragonum v. giganteum* in its parentage. The flowers are 7 cm long.

Fig 4 *Dendrobium* Orana (*D. adae* x *D. 4 monophyllum)* 'Orana' is aboriginal meaning moon; and that's its' colour.

The intention of this kind of hybridising is to lengthen the life of the flowers. So far they seem to last at least three weeks; one plant much longer. They are carrying up to ten flowers on an upright raceme and, no doubt as they mature, they will carry more flowers. The flowers are not as large as *D. adae* but quite a bit larger than *D. monoplyllum.* It flowers at least twice a year, flowering for the first time last August, and quite a few of the plants have been flowering since April, while still only advanced seedlings.

71 Wesley Street,
ELANORA HEIGHTS, N.S.W. 2101

Three Important Orchids

by A.C. Beauglehole, O.A.M.

The three orchids illustrated were discovered new to Science by the author between 1942 and 1971. All three are considered rare or endangered. Adequate precautions must be taken to control invasion of alien animal and plant species, within their respective ecosystems. Finance and personnel are urgently required.

The following broad distribution according to Study Area, Sector, Minor Grid and Sub-Block Identification is provided (see various Study Area Reports for fuller details).

A - Long-tongue Summer Greenhood (*Pterostylis aestiva*)

Alpine Study Area	G	V53;W8,9	28I,L	Cobberas NP
	H	W17	31C	Snowy River NP
	i	W15	34a	Nunniong-Timbarra State Forest (HP)
	i	V53;W8	35e-g	Uncommitted areas (UN)
South Gippsland Study Area	*C	T?	11?	Wilsons Promontory NP
East Gippsland Study Area	c	W9	11b	Uncommitted area (UN)
	*c	or e Z2	-	?

B - Gorae Leek-orchid (*Prasophyllum diversiflorum*)

South-west Study Area	c	E12	-	Gorae West - 2 Private Properties (PP's)
	*f	D49	-	Hotspur; Road & PP (Rd & PP)

C - Swamp Greenhood (*Pterostylis tenuissima*)

South-west Study Area	A	E1,2	1A	Discovery Bay CP
	c	E15	7b	Tyrendarra Coastal Reserve (CR)
	c	E22	-	SW of Portland (PP)
	*c	D47	-	SSE of Dartmoor (PP)
	*i	D10	-	Salt Creek (PP)
Corangamite-Otway Study Area	e	K21	-	Naringal (PP)
	*e	K21,29, 30,31	-	(PP's)
	H	K40	24A	Serpentine Creek WR
South Gippsland Study Area	C	T50	11C	Wilsons Promontory NP

* Indicates "not in A.C. Beauglehole's records".

Note: Also recorded for Picaninnie Ponds Conservation Park, South Australia.

Editorial footnote:
Prasophyllum diversiflorum Nicholls is listed by M.A. Clements (*Preliminary Checklist of Australian Orchidaceae 1982*) as being extinct.

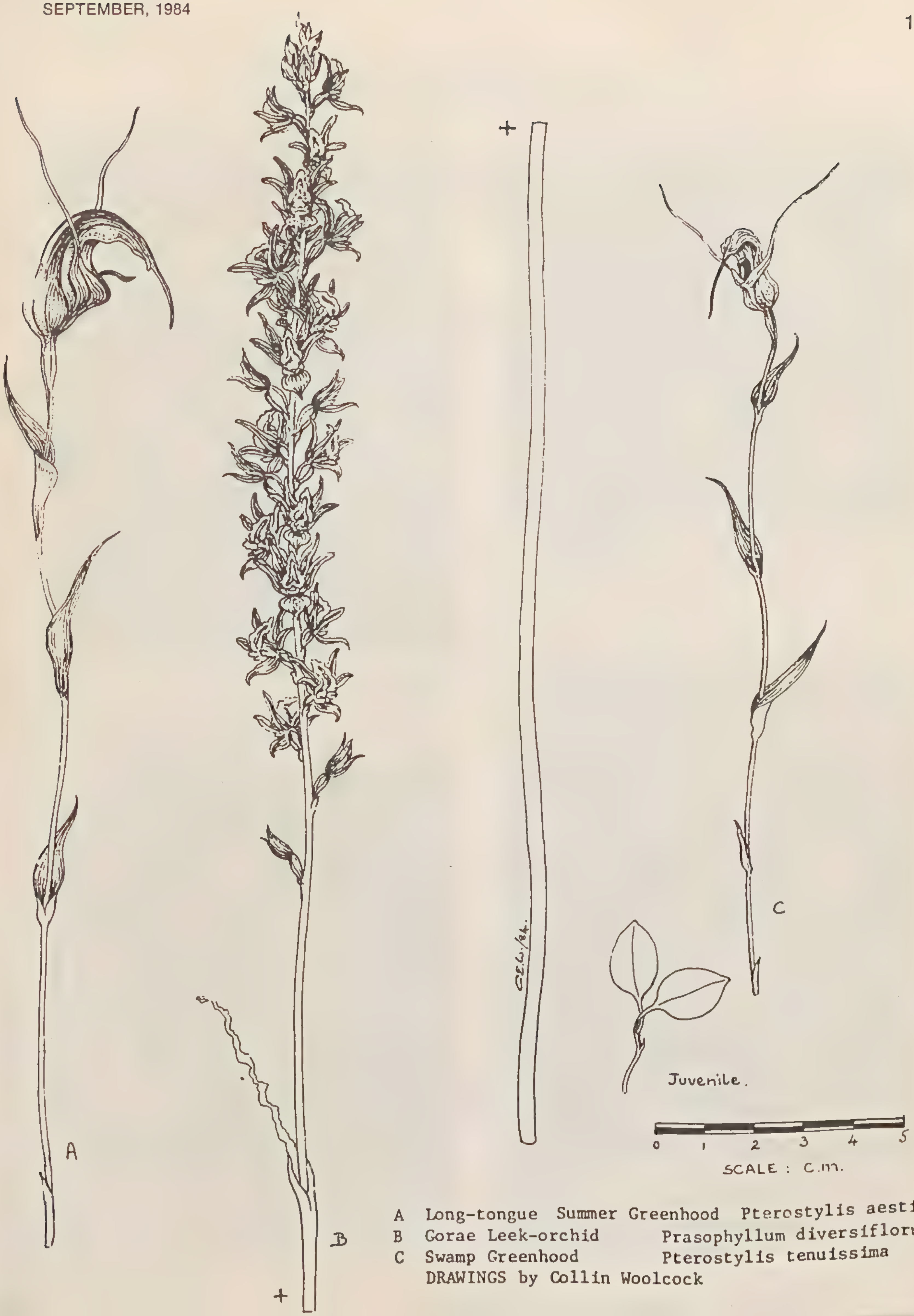
A.C. Beauglehole O.A.M.
3 Beverley St.
Portland
Victoria 3305.

3rd July, 1984

Editorial Footnote

A.C. Beauglehole has asked us to inform readers of the availability of a number of publications by Western Victorian Field Naturalists Clubs Association titled **The Distribution and Conservation of Vascular Plants within Thirteen Victorian Study Areas.**

Nine are presently available: **Mallee, Corangamite-Otway, Alpine, E. Gippsland, North Central, Melbourne, Ballarat, S. Gippsland, South West,** plus 12 Study Area Reports. Obtainable at $7.00 including postage (except Melbourne and South West at $8.00) from The Portland Field Naturalists Club, P.O. Box 470, Portland, Victoria 3305.



A Long-tongue Summer Greenhood Pterostylis aestiva
B Gorae Leek-orchid Prasophyllum diversiflorum
C Swamp Greenhood Pterostylis tenuissima
DRAWINGS by Collin Woolcock

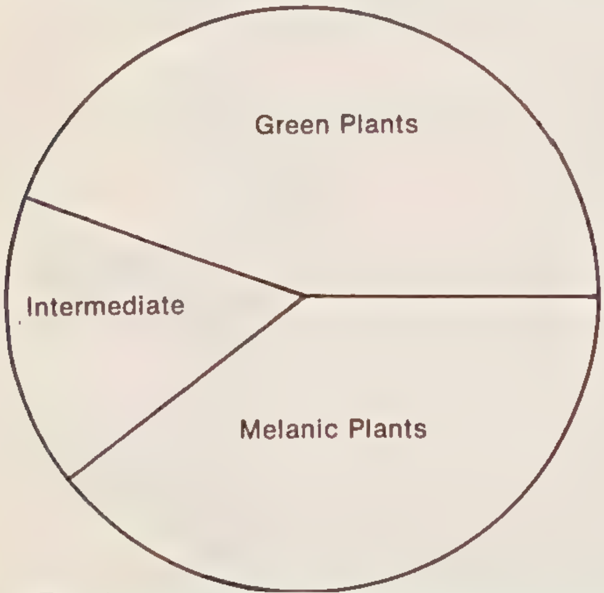
Pollination of *Prasophyllum elatum* R. Br. (with Notes on Associated Biology)

by R. Bates

Introduction:

***Prasophyllum elatum* is one of the commonest and most widespread of the purely Australian Prasophyllums, occurring from south-east Queensland through New South Wales and Victoria to Tasmania, southern South Australia and the south-west of Western Australia. It is also one of the most spectacular species, with up to 80 flowers, 1-2 cm diam. on stems to 180 cm but generally a little under a metre in height.**

As early as 1885 French noted that the species flowered profusely after bushfires. A curious feature of these fire-stimulated plants is that the normally green leaves often become a very dark purple or greenish black the season after a fire (Illus. 1). It has been noted (Bates 1980) that this temporary melanism makes the plants look like fire-blackened sticks and helps to camouflage them from hungry herbivores (Fig 1). Another survival factor also noted by French (1885) is that plants often occur around the base of grass-trees (*Xanthorrhoea* sp.) the spiky leaves of which also serve to protect them from kangaroos and the like. It is suspected that the added potassium and phosphorus provided by bushfires, together with increased light and decreased competition from other plants stimulates *P. elatum* to flower (Bates 1980) although there may be some other physiological factor involved as cultivated plants are not necessarily stimulated to flower by the addition of fertiliser or increased light.



Illus 1. Fraction of Melanic Plants of *P. elatum* in relation to Greens and Intermediates Loftia Park, S. Aust. Nov. 1981.

Very little has been written about the pollination of the true Prasophyllums of the section *Eu-prasophyllum* to which *P. elatum* belongs⁽¹⁾. Rogers (1913) decided (erroneously) that his *P. gracile* (syn. *P. frenchii*) was self-pollinated. He had previously noted (1909) how a variety of insects including bees and the beetle *Trogoderma adelaidae* roamed freely over the flowers and may have effected pollination. Other authors (i.e. Cady & Rotherham 1970) recorded cases of beetles on *Prasophyllum* but the best authenticated cases of pollen vectors in the Eu-prasophyllum section are of wasps (Jones 1972, Bates 1981). The present author has observed wasps to be the most effective pollen vectors on many other South Australian spring-flowering prasophyllums while Stoutamire (pers. comm. 1983) noted that both native and introduced wasps are common pollen vectors on Western Australian members of the genus. No previous references dealing with the pollination of *P. elatum*, have been located.

Methods:

Field work was conducted in several areas of the Adelaide Hills during October to December in the years 1981-1983 mainly in areas razed by bushfires. Insect visitors were collected and reference specimens deposited at the State Herbarium, Adelaide. Observation was carried out under a variety of weather conditions at various times during the day. Temperature and other weather conditions were recorded during observations. Photographs were taken of habitat, plants and pollinating agents. Plants of *P. elatum* have been cultivated since 1978 and have flowered in most years.

Observations:

The flowers of *P. elatum* were found to attract a wide spectrum of insects but only wasps and, more rarely, bees effectively transferred pollinia (See table below). Beetles, ants and flies commonly fed on the flowers but seldom positioned themselves in such a way as to remove pollinia and if they did the pollinia were not effectively transferred.

The attractant for all these insects was found to be nectar, both free on the surface of the callus plate and stigma and in larger amounts within epidermal cells near the base of the labellum, which had to be punctured

(see table, page 16)

Footnote: (1) The pollination of the autumn-flowering Prasophyllums of the section *Micranthum* by small flies has been well documented by Garnet (*Vict. Naturalist* April 1940).

PRASOPHYLLUM ELATUM — Pollination

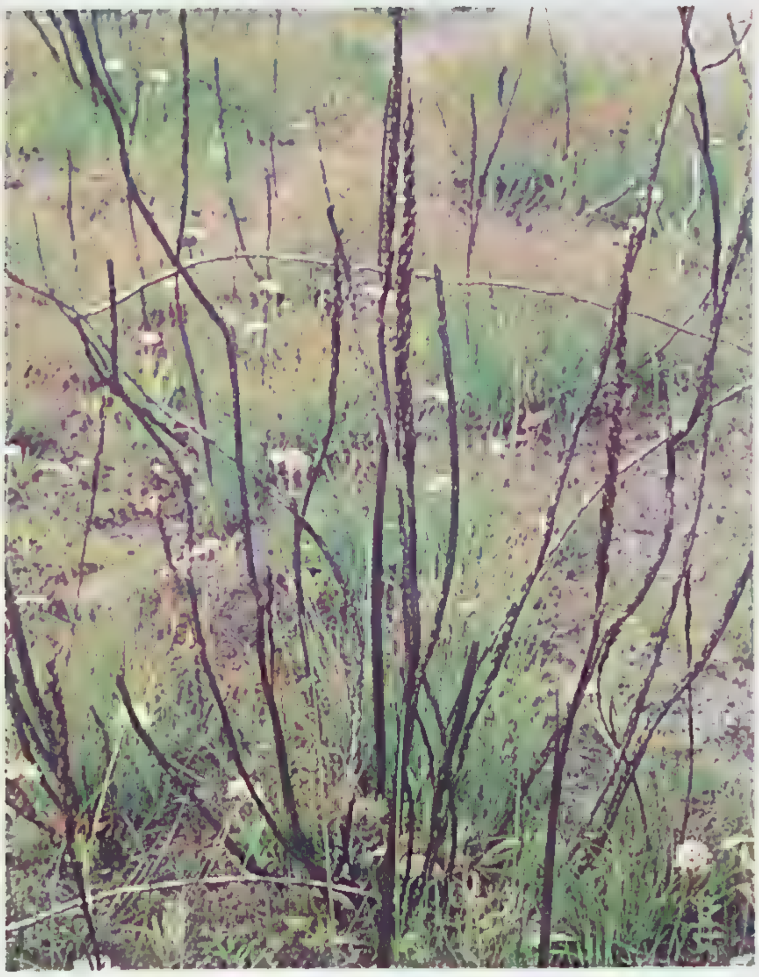


Fig 1 Plants of ***Prasophyllum elatum*** looking like the burnt stems of "tea tree" ***Leptospermum*** growing around them. This camouflage protects them from kangaroos. Photograph: R. Bates, Mylor S. Aust.

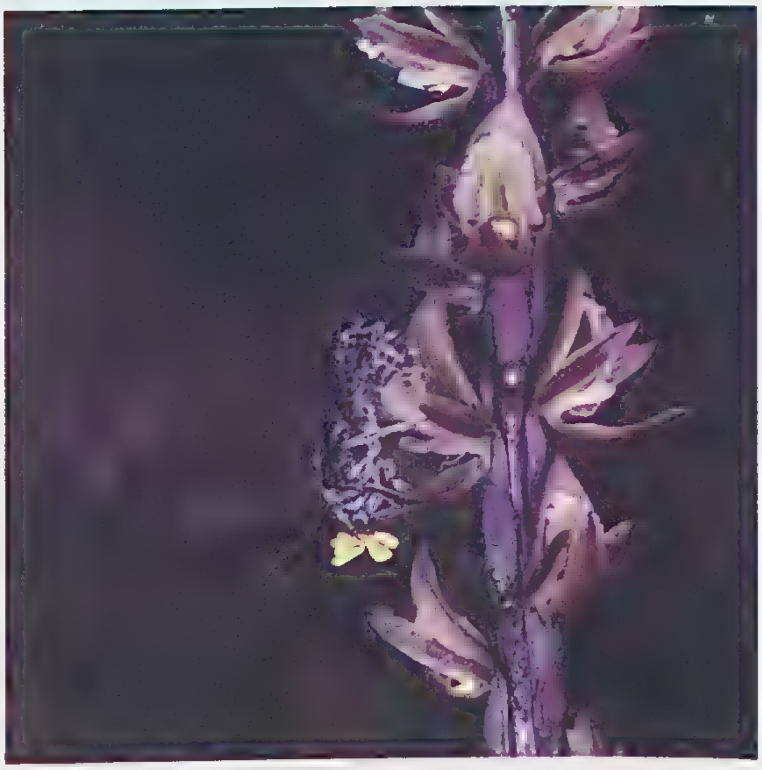


Fig 2 Part inflorescence of ***Prasophyllum elatum*** showing male thynnid wasp in position after removing pollinia, with female ***in copula.*** Cleland Cons. Park near Adelaide. Photograph: R. Bates.

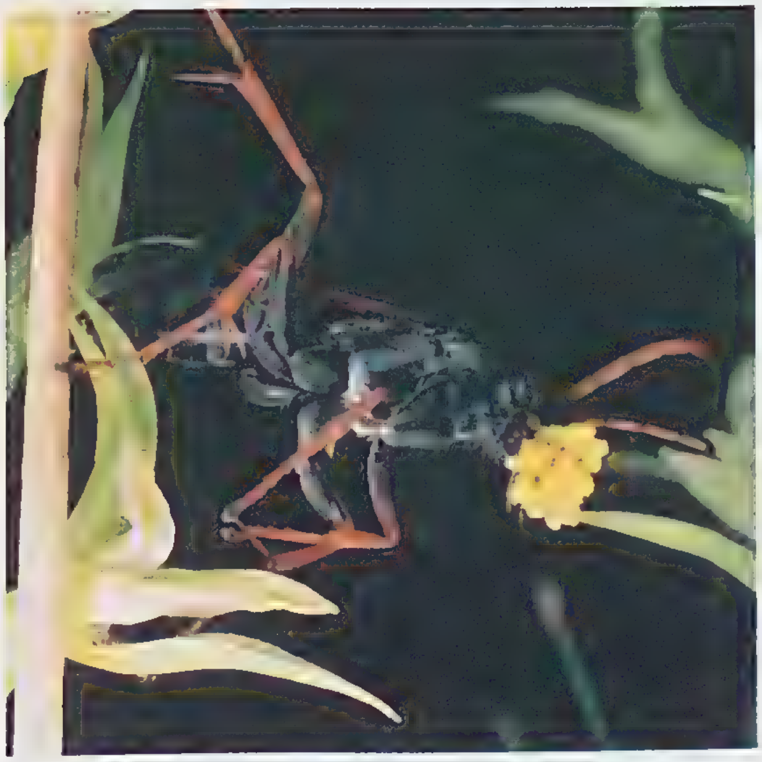


Fig 3 Ichneumon wasp on ***Prasophyllum fuscum.*** Note the numerous pollinia adhering to the wasp's frons. Photograph: R. Bates. (Near Adelaide Nov. 1983.)

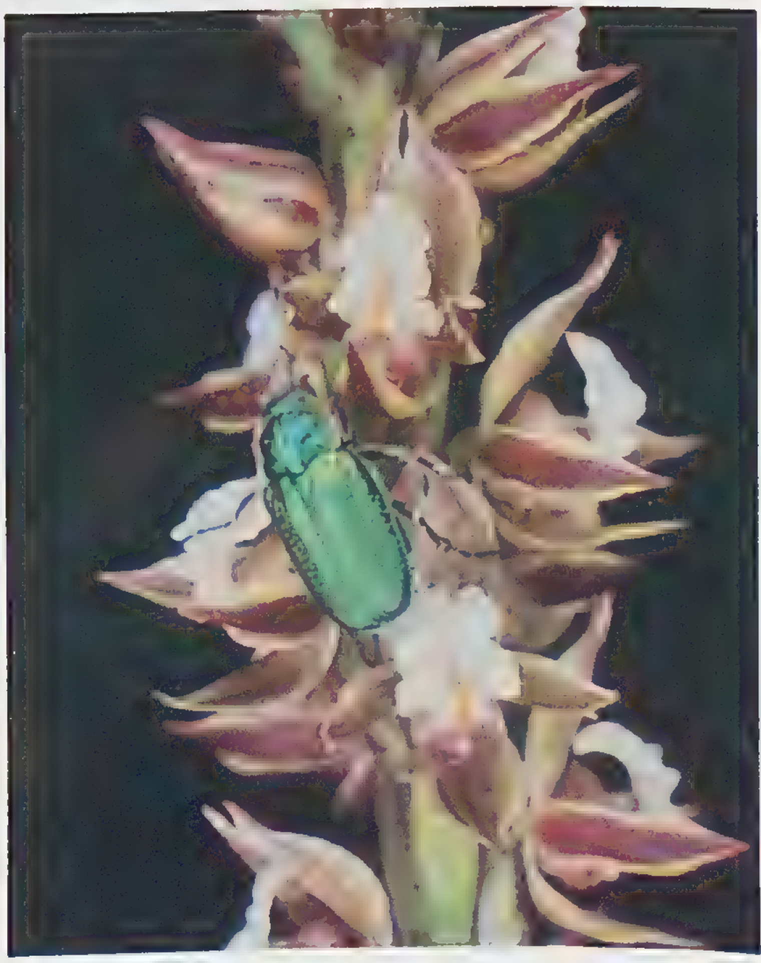
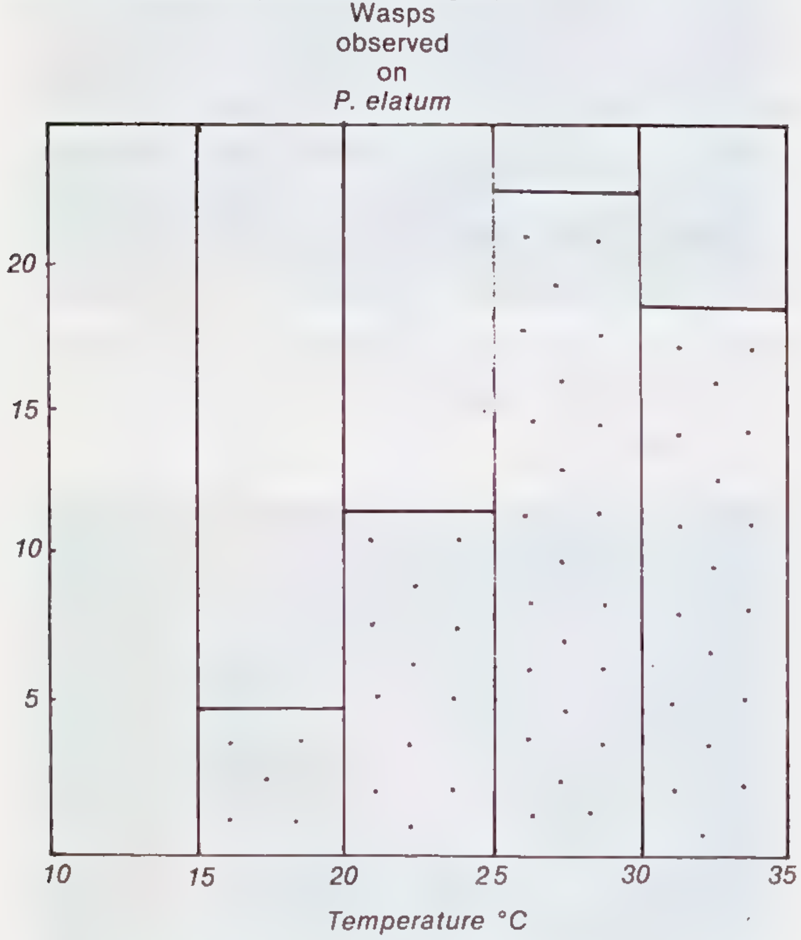


Fig 4 One of numerous species of beetle which can often be seen on ***Prasophyllum*** species without transferring pollinia. This jewel beetle ***(Buprestidae)*** is on ***P. australe.*** Photograph: R. Bates (Mylor Dec. 1980.)

before the nectar could be obtained. The flowers are faintly sweet scented and this would serve to advertise the presence of nectar. The predominant flower colours of *P. elatum* (green, cream and brown or maroon) are known in other species of Australian orchids to be particularly attractive to wasps (Stoutamire 1983, Bates 1983). The usual proximity of the prasophyllums to flowering plants of *Xanthorrhoea,* which also flower more freely after bushfires and produce copious supplies of nectar may be an example of floral mimicry. The *Xanthorrhoea* have dark-coloured scapes topped by numerous light-coloured flowers in a long spike of similar shape to the flower spikes of *P. elatum* (but much larger).



Illus 2. Activity of Thynnid wasps on *P. elatum* in relation to air temperature. (Approx. equal time for each temp. range.)

There was no evidence of pheromonal attraction. Although only male wasps pollinated the plants they did not show signs of sexual interest. All wasps observed transferring pollinia during the study were of one species of *Thynninae,* a large black species some 2-2.5 cm in length. The females of such thynnid wasps are wingless and the males carry them about *in copula.* On several occasions the author observed a male wasp feeding on one *P. elatum* flower while the attached female attempted to feed on an adjacent one. (See Fig 2). These females were not observed to collect pollinia. Other wasps, particularly *Ichneumonidae* were occasionally seen on *P. elatum* but they were small species which fed in such a way as not to contact the viscidium of the orchid. On one occasion an ichneumon wasp was observed to be attacked and chased away by a thynnid male. Native bees (*Colletidae* sp.) visited the flowers quite frequently but as these bees are very small they were seldom strong enough to remove pollinia, often became wedged in a flower for some time and were never observed with more than one set of pollinia, whereas the thynnid wasps often carried numerous pollinia which together resembled a plume of yellow feathers. (See Fig 3).

Wasp behaviour:

The thynnid wasps normally flew directly to the *P. elatum* flower spike without circling about, either from up-wind or down-wind (more frequently the latter). They would land haphazardly on the flowers but quickly align themselves head downward on the labellum and begin searching for nectar, probing the base of the callus plate and often puncturing the surface. During these movements they would contact the viscid disk with their frons and the disk would adhere pulling away the pollinia from the anther cells; the pollinia then fell forward under their own weight. The amount of time spent in each flower varied a great deal, probably in relation to the amount of nectar available.

It might be for only 1-2 seconds on flowers which have already been pollinated, but could be as long as a minute on freshly opened flowers, particularly if a female wasp is being carried. The wasps might work up to a dozen flowers before flying to the next plant or they might visit only one before moving on.

The *P. elatum* in the study areas grew in large 'colonies' of as many as 200 plants per hectare. At each subsequent flower visited the pollen massulae on the wasp's head would be stripped off layer by layer so that pollen from one flower could be transferred to a dozen or more plants. The wasps did not necessarily go straight from one plant to the nearest; they often by-passed twenty or thirty plants before landing on one some fifty metres away. When feeding on the prasophyllums they tended not to visit other species of plant, either orchid or otherwise, although at various times the same, or a similar, species of wasp was observed feeding on the nearby *Xanthorrhoea.* Once pollinated, the flowers of *P. elatum* close quickly, usually within 24 hours.

As noted by Stoutamire (1983) thynnid wasps are not very active below 20ºC or on cloudy days. The wasps pollinating *P. elatum* were found to be most active at temperatures above

25°C and were still reasonably active at 35°C. (See Fig 2). Visiting bees were also more active above 20°C.

The previous references suggesting that *Prasophyllum* species are pollinated by beetles, flies etc. (i.e. Rogers 1913, Cady & Rotherham 1970, Beardsell & Bernhard 1982) no doubt resulted from the fact that many species (particularly *P. australe* and other swamp lovers) are commonly visited by beetles (See Fig 4) which do occasionally remove pollinia but either do not transfer it or if they do, usually on flowers of the same spike, thus preventing effective outcrossing. I have never observed beetles on *Prasophyllum* to be carrying more than 1 set of pollinia. Sensible native orchid enthusiasts and field naturalists tend to make excursions into the bush on cool days when beetles and flies are most active, and it is therefore these insects they will see. As the wasps and bees are most active on hot, sunny days they tend to be missed by the casual observer.

The total numbers for each type of insect seen on flowers of *P. elatum* during the study period are given in the table below. The percentage of these insects seen bearing pollinia is also given.

Insect	**Number seen**	**Percentage with Pollinia**
Thynnid wasp, male	87	76%
Other wasps	4	0
Native bees (mainly Colletidae)	56	9
Ants (mainly Myrmecia)	72	0
Flies (numerous kinds)	150	0
Beetles	42	2
Honey bees (Apis)	5	0

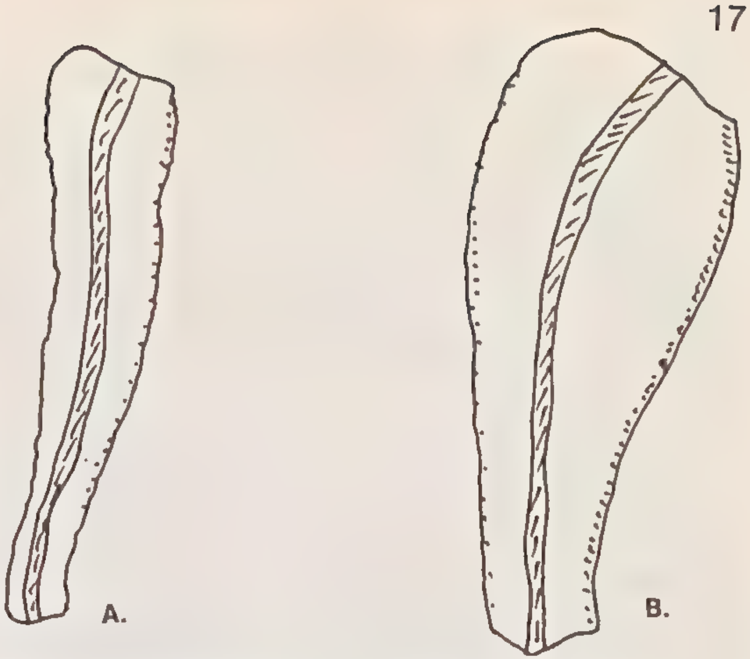
Various other insects were seen in small numbers; none with pollinia.

Development of seed capsule in *P. elatum*:

Jones (1972) noted that the seed capsules of many *Prasophyllum* species will swell without fertilisation having occurred, although seed will not be produced. This happens only to a minor degree in *P. elatum*. Fertilised seed pods of *P. elatum* double their size in about 9 days, becoming rigid and glistening. Unfertilised flowers close about 10 days after anthesis; the seed capsule swells slightly but is dull and spongy compared to fertile capsules. (Illus. 3).

Notes on pollination of other Prasophyllums in South Australia

The author has observed wasps (both Ichneumonidae and Thynninae) pollinating the following species — *P. australe, P. fuscum, P. hartii, P. occidentale, P. patens* and *P. validum.* This includes observations of Ichneumonidae females on *P. fuscum,* showing that male wasps are not exclusively involved! Experiments with the above species has shown that they will not set seed if protected from insects. Other species, i.e. *P. pallidum,* can apparently be self-pollinated and four species (*P. goldsackii, P.* aff. *macrostachyum, P.* aff. *fitzgeraldii* and *P.* aff. *fuscum*) have been shown to be at least partly apomictic (Bates unpub.))



Illus 3. Development of seed capsule of *P. elatum:*
A — Seed capsule of unfertilised flower 2 weeks after flower closure;
B — Seed capsule of fertilised flower 2 weeks after pollination.

E. Matthews (Adelaide Museum, pers. comm.) notes that thynnid wasp larvae are parasitic on soil-living insect larvae particularly those of scarab beetles which are known to eat orchid tubers. It seems that the wasps do a double service to *P. elatum!*

References:

Bates, R. (1980) "*Prasophyllum elatum* : with notes on cultivation, "*J. Nat. Orch. Soc. S. Aust.* 4(9):3

Bates, R. (1981) "Pollination of orchids : part II (Prasophyllum)." *J. Nat. Orch. Soc. S. Aust.* 5: 24-25.

Beardsell, D. & Bernhard (1982) "Pollination biology of Australian terrestrial orchids" in E.G. Williams et al *Pollination '82* pp. 166-183 Cady L. & Rotherham (1970) 'Australian native orchids in colour" (Reed: Sydney)

French, C. (1885) "Orchideae of Victoria", part 6, *Vict. Naturalist* 2: 120

Jones, D.L. (1972) "The pollination of *Prasophyllum alpinum*" *Vict. Naturalist* 89: 260-263

Rogers, R.S. (1909) "A critical review of some South Australian Prasophylla ... " *Trans. R. Soc. S. Aust.* 33: 197-222

Rogers, R.S. (1913) "Mechanisms of Pollination in certain Australian Orchids" *Trans. R. Soc. S. Aust.* 37: 48-64

Stoutamire, W. (1983) "Wasp-pollinated species of *Caladenia* in south-western Australia" *Aust. J. Bot.* 31: 383-94

The Regeneration of "La Mancha" and It's Orchids

by C.K. Ingram

Australia it is said, is the only country in the world about which a complete history of it's settlement may be written .....

This then, is a brief attempt to trace the history of one plot of land, 6.05 h.a. to be exact — known as "La Mancha", Old Ball's Line of Road, Mt Tomah, . from it's first sighting by Europeans to the present — from it's clearing to an attempt at restoration.

Aborigines of the area belonged to the Daruk branch of the great Kamilaroi tribe, but they tended to avoid the Tomah district, claiming it was the haunt of the "debbil debbil". However, one old warrior remained after the coming of the Europeans, and wore around his neck, in later life, a brass plate inscribed "Kootee, King of Mt Tomah". Even today relics are occasionally retrieved, and some lookout rocks bear evidence of axe and spear sharpening, apparently to while away the time.

George Caley, a botanist, and the first European to set foot on the mountain, wrote in his Journal *"An Account of the Journey to Mt Banks in November, 1804"*, a short description of what he called Fern Tree Hill, and which we now call Mt Tomah:

"This hill is seen from many parts of the colony, and appears to be the highest land by far. The scrub seems to occupy the whole of the summit as well as most of the other parts. It consists of a species of *Zieria*, a glaucous-leaved *Senecio*, a white-flowered *Teucriuni*, a species of *Smilax*, which retarded our progress very much, nettles, etc., which grew very high and sting vehemently. The part which was void of brush was thickly covered with timber, and with a species of fern which, as it increases in age, forms a tree. These trees were very numerous, and some of them at a rough guess might be computed 15 yards in height. The soil was very damp and of a brown colour, being a vegetable mould. In many places loose stones occurred, and we crossed some vallies where the water oozed in small quantities.

..... At times ..... we found the brush almost impenetrable in places. What made it still worse, was each now meeting with dead fallen trees. Sassafras trees I noticed in great abundance, some of which are very large. *Ceratopetalum apetalum* was now common, and grew larger than what it generally does in other places. These two trees having a dark and thick foliage cause the places where they grow to be so damp and dark ..... In speaking of the toil of the journey ..... I think I may safely say it was the most laborious man ever went to."

In fact, Caley likened it to travelling over the tops of houses in a town, and one of his men, on seeing a crow, suggested it must be lost or it never would stay in such a place!

Caley's report to Governor King (and then Sir Joseph Banks) was discouraging as he found only Fern Tree Hill had cultivable land; but how were people to get there, "and what is their produce to be done with, except for feeding swine?" King concluded that "persevering in crossing those mountains ..... would be as chimerical as useless".

Well, people did get to it! Archibald Bell, 19 years later (1823), allegedly guided by a native girl, effected a safer and more feasible route to the mountain by keeping well to the north of Caley's "Devil's Wilderness". Yet even he had to cut his way through nearly 5 kms of brush on the immediate ascent to Tomah.

A survey party, led by Robert Hoddle, was quickly on the scene (9/1823) and gave a completely favourable report: "Upon the summit," he wrote, "..... the soil is rich and vegetation very luxuriant. The timber, gums and stringybark, are large in size, but upon Tomah extraordinary". He thought the area "would be eligible for small settlers".

Allan Cunningham, the great botanist, followed soon after (11/1823). He it was who noted that the mountain was called "Tomah" by the aboriginies. He wrote (p. 356): "..... In the centre of the Blue Mountains chain, directly west from Port Jackson, is a remarkabe eminence, called Tomah, the height of which, above the level of the ocean, has been ascertained to exceed 3,500 ft. [Latest surveys put it at 3,329 ft or 1015 m.] Before the axe of the colonist was carried to the base of the mountain, in the great chain, viz. prior to 1823, Tomah had its flanks and summits clothed with a dense vegetation consisting of timber trees, loving shade and moisture, laden with orchidaceous epiphytes, and borne down heavily by gigantic climbers; and beneath them, in deep shade, flourished many noble specimens of an arborescent fern (the *Cibotium billardieri* of Kaulfuss — [now *Dicksonia antarctica*], which was not previously known to exist in New South Wales).

..... It may here be added, that all specimens of *Citobium*, examined at that period on the Tomah mountain, had young seedlings of the *Quintinia* (sieberi) growing on their trunks ....." He continued (p. 285) ..... "Upon entering the forest, the traveller is struck by the change of appearance of the timbers from the Eucalypti of the open country the stupendous size and extraordinary windings of the climbers ..... and with the magnificence of the tree ferns ..... Twining and climbing plants of vast strength and magnitude hang from the heads of the loftiest trees, and bore upon their pliant stems abundance of climbing *Polypodia* (2 species of *Microsorum*) and tufts of *Dendrobium (pugioniforme)* ..... Another plant of this beautiful family rarely to be met within the colony, I observed in flower sparingly — it was *Sarcochilus falcatus*, of which I also gathered a few living specimens. Hanging in attenuated clusters from the highest branches of the trees I detected a third species of this family, and probably a *Dendrobium* not apparently noticed by Mr (Robert) Brown [*D. teretifolium var. fairfaxii*]. (p. 286). Its leaves are from eight to twelve inches long, perfectly cylindrical and attenuated at each extremity — these were inserted upon long slender almost filiform stems, the whole being supported by strong thick roots which adhere firmly to the branches of the trees, from whence these plants swing in the breeze unencumbered and clear of the stems ..... (p. 289) I employed myself collecting the parasitic Orchideae of these shaded situations, of which three species are generally diffused through the forest, although difficult of access since they hung from the highest branches generally of the largest timber trees, which I had not possibly the means of cutting down: however, I collected of the following as much as my enfeebled packhorses could possibly carry away, carefully packing them away in moss, which is most abundant in these woods, *Sarcochilus falcatus* in flower at this period, growing onto the branches of sassafras, *Dendrobium pugioniforme* (allied to *D. rigidum*): and a third species with long cylindrical leaves hanging from the highest trees." [*D. teretifolium var. fairfaxii*]. He concluded: "The mountain of Tomah, from the permanency of its shade, and general humidity of the atmosphere of its elevated summits, giving a peculiar character to its vegetation, appears every way more interesting to me in my pursuit of Flora ....." (p. 288).

Tomah was now ripe for settlement. A retired army lieutenant, G.M.C. Bowen, was given the task of laying out the boundaries of a new county, Cook, in which Tomah is situated. For his services in the army, he received a grant of 2,560 acres (1,036 ha.) just east of the mountain, as from 1829. His mother, Susannah, who was accustomed to following her son to his army stations, then arrived from India, and proposed to the Governor a selection, one mile by two, on the top of Tomah! When told this was too much and, in any case, too difficult to define because of the cliffs and chasms, she ultimately settled for a 1,280 acre (518 ha.) block, of which she took possession in 1830. However, she apparently did nothing with it, and in 1836 returned to England. Her grant was "sold"* to Capt. George Bartley, of Windsor, for £50, in 1838. Even then there is no evidence of anyone actually living on the mountain until the late 1860's. In all contemporary accounts of visits to the mountain, written by Thomas Cadell (1851), Louisa Atkinson and Rev Dr William Woolls (1861), they all comment on its wild untouched beauty. For instance, Cadell, speaking of Bell's Line as a well-patronised pedestrian route to the Bathurst Goldfields, noted its "awe-striking grandeur, a fearful solitude ..... which may be witnessed and felt but cannot well be expressed".

Ten years later, Louisa Atkinson wrote in her column in "The Sydney Morning Herald" — "The road we are pursuing is the great throughfare of the cattle and sheep which supply the Sydney market. Vast herds continually traverse it ..... To those who can really appreciate nature, there is a rich fund of enjoyment, and a field of research rendered doubly interesting from having been the scene of some of Allan Cunningham's botanical wanderings ..... It is impossible to convey a correct description of vegetation so profuse as obtains on the summit of this mountain to those who have not witnessed similar scenes. Here ..... the words luxuriant, fresh, green — all the epithets which can be piled together to express a superabundance of beauty in tint and form — are in constant use ..... The tree fern reigns here ....."

Although she details numerous ferns, mosses, the *Quintinia*, some *Boraginaceae*, *Prostanthera lasianthos*, legumes and *Acacias*, there is no mention of the orchids that so excited Cunningham.

Woolls, too, says:
"I shall not allude particularly to the parasitical orchids of Tomah ..... because fewer of them flower in the season at which I visited the place", although elsewhere he does record two species of *Sarcochilus*, viz. *falcatus* and *hillii*. He concludes: "I cannot do otherwise than recommend ..... persons fond of natural history to visit ..... Tomah. The scenery is truly magnificent, and exercises a powerful influence on the feelings, especially in those places from which a panoramic view of the low country and its misty towns, is distinctly visible as the moving hours pass away ..... The bracing air of the mountain cannot but renovate a frame enervated by the cares and troubles of a city life".

Despite the "sale" of the Tomah holding to Capt. Bartley, the Bowens later resumed their interest in the land, and Susannah's grandson George Bartley Bowen (obviously named after the aforesaid Captain), spent a good deal of time on Tomah before selling all of it to Major Philip Charley, of Broken Hill fame, in 1895. The latter probably used his purchase for breeding poll cattle and coach-horses, until 1921, when the Crown acquired some of it, including "La Mancha", for soldier settlement. Clarence Hungerford was the successful soldier-settler applicant, and farmed it until 1924, calling it "Barina" (The Summit), growing potatoes, pigs and bees. His house was destroyed by a bushfire. This, plus distance from urban markets, poor road communications, and problems of clearing the land of timber and rocks caused him to move down to the foothill country eastward.

Once more the Bowens returned in the person of Norman Bowen, a nephen of G.B. Bowen. More land was cleared of timber and rocks and the biggest cabbages ever seen in the area, as well as alstroemeria, were grown!

At the end of World War II, the Powell brothers took over, and began the present house (1947). Ill-health caused them to sell to A.M. Craig who set about creating the present "La Mancha", in 1954. Thus, by the end of the so-called "development period", when "La Mancha" was abandoned as a farm, only dead trees of *Eucalyptus fastigata* and century (and more) old *Cyathea australis* persisted above a dense hotch-potch of peripheral rainforest shrubs and weeds — *Prostanthera lasianthos, Hymenanthera dentata, Helichrysum dendroideum, Teucrium corymbosum, Coprosma quadrifida, Senecio linearifolius, Conyza albida, Cirsium vulgare, Rubus vestitus* and *Carex appressa*, with the occasional *Acacia melanozylora, Hedycarya angustifolia* and *Doryphora sassafras* struggling to get a foothold. Sadly, the aboriginal name, "Barina", was lost in the changes of ownership since 1924. Craig was well acquainted with the La Mancha region of Spain, and saw in his acquisition a similar "wilderness" quality, despite the aridity of the one and the luxuriance of the other. With characteristic zeal and energy he laboured for over 12 years to create of "La Mancha", a park-like property along English country lines, planting pines, elms, cypresses, oaks, planes; and cherry-laurel, holly, hawthorn and photinia hedges, despite near disasters from bushfires such as those of 1947 and 1957 and limited funds.

At his death in 1966, a manuscript was found among his papers, "Man versus Tomah", in which he advanced the hypothesis that Man could not conquer Tomah, but that, in the end, the jungle would return to envelope Man's puny efforts.

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* The purchase price was considered too low and officially disallowed later.

Therefore, in the belief that if one can't beat an opponent, one should join it, the present owners have set about encouraging the return of the rainforest to the most favourable areas (where the giant cabbages once flourished!), and permitting judicious intrusion of rainforest and wet sclerophyll forest species elsewhere. Thus, we see scattered, rapidly-growing trees of the previously most common species on the summit (*Eucalyptus fastigata*), in portions more or less secure from bushfires; and *E. blaxlandii* being permitted to intrude, as of yore, along the western boundary (incidentally, originally, its most easterly distribution).

Brough, McLuckie and Petrie, in their study of a sister basalt mountain Mt Wilson, (1924-6), noted that the Blackwood (*Acacia melanoxylon*) was but a minor constituent of the rainforest, the two dominants being *Doryphora sassafras* and Coachwood (*Ceratopetalum apetalum*). In the regeneration of Mt Tomah since 1954, however, the Blackwood has shown amazing recuperative powers, its seeding propensities, in certain seasons, being tremendous. The Sassafras maintains its equally-dominent position, regenerating both by seeds and suckers around stumps of former mature trees, thus creating a coppicing effect. On these two the vision of "La Mancha" is based; firmly, we believe.

Coachwood, unfortunately, has as yet not succeeded in promoting a single seedling, although a neighbouring property claims some success. In an effort to speed up the process, several have been introduced and are flourishing.

It was hoped that the rapid primary growth of *Prostanthera lasianthos* (Mint Bush) would have provided a canopy under which seedlings of shrubs and trees such as *Hedycarya angustifolia, Quintinia sieberi, Rapanea howittiana, Acmena smithii* and *Sambucus australasica;* the tree-ferns, *Cyathea australis* and *Dicksonia antartica;* the vines, *Pandorea pandorana, Marsdenia suaveolens, Parsonsia straminea, Smilax australis, Celastrus australis* and *Cissus hypoglauca* and, say, a half dozen epiphytic orchids would have flourished, but after 15 to 20 years, *Prostantheras* are now collapsing, through age, snow and wind, leaving great gaps in the essential canopy, as yet inadequately filled by the more durable species — particularly Sassafras and Blackwood. We try to encourage them by heaping debris onto the floor to provide mulch, build up humidity and provide protection from marauding wallabies. Even so, the process of regeneration is proving more difficult and of longer duration than appeared likely at first. However, despite this setback, there **is** progress with the upper storey of trees, the medium storey of shrubs, and with the ferns, mosses and orchids.

The story of the orchid "come-back" is typical. In 1954 the position was as follows:

Despite the lack of cover and exposure to desiccating winds, *Gastrodia sesamoides* flowered each Christmas in profusion around the forlorn, decaying stumps of the forest giants noted by Caley, Cunningham, Hoddle, Louisa Atkinson and Woolls; and an occasional *Spiranthes sinensis subsp. australis* flowered in late summer in patches remote from cocks-foot, Yorkshire fog and white clover. These have persisted to date, with the *Spiranthes* becoming, in general, fewer from the depredations of rabbits, wallabies, dry seasons and aggressive, introduced pastures. A colony of *Microtis unifolia* still struggles in the pastures, but it is not able to extend its domain.

The real success story is *Pterostylis pedunculata.* First noticed on "La Mancha" by Brian Whitehead in 1968, it is now, each year, extending its influence to patch after patch of hedge and shade, until one is rarely distant from its rosettes. Some even grow on the trunks of tree-ferns. In short, its comeback is nothing short of dramatic!

There are significant indications that other *Pterostylis* may be repeating the performance of *P. pedunculata:* in 1982, *Pterostylis obtusa* appeared (say, a half-dozen specimens) under the *Pinus radiata* windbreak. By this year it has already become a flourishing colony, and has left the *radiata* shelter for that provided by a stand of *Populus yunnanensis* intermixed with evergreen shrubs; then, this summer (1984), *Pterostylis decurva* was discovered in the shade of a coppice of sassafras — only 3 plants, to be sure, but a beginning!

Terrestrials to be sought in the years to come, as the protective canopy develops are *Caladenia catenata, Diuris aemula, D. sulphurea, Corybas aconitiflorus, Acianthus fornicatus, A. exsertus* and *A. caudatus, Prasophyllum flavum* and *elatum, Chiloglottis reflexa, Eriochilus cucullatus, Pterostylis grandiflora, curta, nutans* and *longifolia.* Perhaps we may cheat a little by endeavouring to speed up the process — say an occasional planting of *P. curta, nutans* and *C. reflexa* tubers? No? Surely, the end justifies the means!

Our good luck story extends to the epiphytes, and with an unusual twist: We had, from the inception of our ownership (1966), placed surplus *Dendrobium pugioniforme, aemulum, speciosum, teretifolium, falcorostrum, striolatum, kingianum* and *Liparis reflexa* on suitable hosts in the designated rainforest area. The *D. falcorostrum* did particularly well, flowering regularly, despite its not being originally found in the area, but the similarly placed *kingianum,* although growing equally satisfactorily has obstinately refused to bloom. We erred in our choice of host: The *Prostantheras* seemed ideal — rough, firm bark and plenty of suitable forks, but their life, we found was quite short, and in due course we had to transfer the epiphytes to Blackwoods. We have learnt from experience, but it was a setback.

The twist came several years ago when Peter Hind discovered *Plectorrhiza tridentata* on an exposed *Populus yunnanensis* — a foreigner, and outside our rainforest canopy area! Why not on our properly-constituted rainforest trees nearby, as planned? A little later, a second specimen was found — also on an exposed *P. yunnanensis* and facing north, not south east, as previously. Is there no discipline among Plectorrhizas? No constancy? A hurried search then revealed a *Sarcochilus falcatus,* this time according to plan, thank goodness — in the rainforest area, on a blackwood, and on the side remote from desiccating winds — just where any self-respecting epiphytic orchid should be.

I confidently expect there will be more. For years I have watched the Creeping Felt Fern (*Pyrrosia rupestrius*) spreading over the radiata pines in the breakwinds, and I have diligently sought among it for embryonic epiphytic orchids, as I had seen at "Ynego", Mt Wilson, but nary a one has turned up. I guess one day soon another Peter or Brian will casually turn up and find them — much to my delight and chagrin. And that goes for Bob Lowe, Peter Vaughan, Joe Betts, Ern Todd and other old timers!

References:

1. Woolls: *Contributions to the Flora of Australia,* 1861.
2. Biographical sketch of Allan Cunningham (Robert Heward, 1842), reprinted from *Journal of Botany*, Vol. 4.
3. *"Sydney Morning Herald"*, 1860-61: Column by Louisa Atkinson, entitled "A View from the Country".
4. G. Caley: *An Account of the Journey to Mt Banks in 1804.*
5. Hoddles Diary, quoted in *Reports to the Colonial Secretary by Surveyor-General, 1810-1826, pp. 109-114.*
6. Thomas Cadell: Article in *"Sydney Morning Herald"*, 4th July, 1851.

Checklist of Mt Tomah Orchids, 1984.

Acianthus fornicatus R.Br., - Sh.
Bulbophyllum crassulifolium (A. Cunn.) Rupp. - E.
    exiguum F. Muell. - E.
Caladenia catenata (Sm.) Druce var. catinata. - B.Sh.
Calochilus paludosus R.Br. - Ss.
Chiloglottis reflexa (Labill.) Druce - B. Sh.
Corybas aconitiflorus Salisb. - B. Sh.
Cryptostylis eracta R.Br. - Sh.
    leptochila F. Muell. ex Benth. - Sh.R.
Cymbidium suave R.Br. - E.
Dendrobium aemulum R.Br. - E.
    pugioniforme A. Cunn. - E.R.B.
    speciosum Sm.E.
    striolatum Reichb.F. - E.
    teretifolium R.Br.
    var *fairfaxii* (FitzG. et F. Muell.) F.M. Bail. - E.R.
Dipodium punctatum (Sm.) R.Br. - Sh. Ss.
Diuris aequalis F. Muell. ex FitzG. - B.
    platichila FitzG. - B.
    sulphurea R.Br. - Ss. B.
Eriochilus cucullatus (Labill.) Reichb.f. - B.Sh.Ss.
Gastrodia sesamoides R.Br. - B.
Genoplesium baueri R.Br. - Ss.
Liparis reflexa (R.Br.) Lindl. - E.
Microtis unifolia (Forst.f.) Reichb.f. - B.Sh.
Orthoceras strictum R.Br.
Plectorrhiza tridentata (Lindl.) Dockrill E.
Prasophyllum brevilabre (Lindl.) Hook,f. - Ss.
    elatum B.Br. - Sh. Ss.
    flavum R.Br. - B.Ss. R.
    rufum R.Br. - Ss.
    striatum R.Br. - Ss.
Pterostylis decurva Rogers - B.
    grandiflora R.Br. - Ss.
    longifolia R.Br. - B. Sh.
    nutans R.Br. - Sh. Ss.
    obtusa R.Br. - B. Sh.
    parviflora R.Br. - B. Sh. Ss.
    pedunculata R.Br. - B.
Rimacola elliptica (R.Br.) Rupp - Ss.
Sarcochilus australis (Lindl.) Reichb.f. - E.Ss.R.
    falcatus R.Br. - E.B.R.
    hillii (F.Muell.) F.Muell. - E.R.B.
Spiranthes sinensis (Pers.) Ames. ssp.
    australis (R.Br.) (R.Br.)
    Kitamura - B.Sh.
Thelymitra circumsepta FitzG. - R.B.
    ixioides Sw. var. *ixioides* - Ss.
    pauciflora R.Br. - Ss.

Key:

B - Basalt;
E - Epiphyte or Lithophyte;
R - recorded in Bot. Lit. for Tomah;
Sh - shade;
Ss. Sandstone.

C.K. Ingram
"La Mancha"
Mt. Tomah, 2758.

9th April, 1984

Growing Papua New Guinea Species

To prove that Scotland produces more than Scotch whisky, Dr Warren of Edinburgh is currently producing nearly 200 species of orchids by tissue culture; these are available in mini-flasks of up to five seedlings ready for planting out.

The 1983-84 list issued by Dr Warren nominated 23 P.N.G. species, principally *Dendrobium,* including some magnificent plants from the *Oxyglossum* section such as *D. aurantiroseum, D. hellwigianum, D. cuthbertsonii, D. pentapterum, D. vexillarius* and those beautiful *Latouria: D. rhodostrictum, D. atroviolaceum, D. forbesii, D. finisterrae,* etc.

Many of the species have been raised using stock from the fine collection of Papuasian Orchids grown at the Royal Botanic Garden at Edinburgh and collected originally by P.J. (Paddy) Woods in Papua New Guinea during the 1960's.

Prices for a flask of five seedlings range from $A7.70 to $A14.50 plus approximately 25% for packing and postage.

A species and price list may be obtained by writing to:

Dr R. Warren
Equatorial Plant Co.
35 Broughton Street,
Edinburgh EH1 - 3JU
Scotland

Mycorrhiza of Western Australia Orchids

Reprinted from Western Australian Native Orchid Study and Conservation Group Bulletin.

Preview of a biological study of Orchid Mycorrhiza

by Kingsley Dixon and Robert Ramsay

Literally translated mycorrhiza means mushroom or fungus root and refers to the symbiotic association between a plant and fungus, usually restricted to tissues of roots and underground stems.

This fungal symbiosis apparently benefits the orchid plant by providing a variety of mineral elements and even carbon skeletons in the form of simple sugars, not normally available to the host. In exchange, the fungus is encouraged to grow and proliferate in the host tissues. Other mycorrhiza associations occur as a superficial weft surrounding fine lateral roots. Pine roots and many other plant roots exhibit this type of symbiosis. Indeed fungi are now being revealed as beneficial agents in a host of plants contradictory to their more notorious pathogenic roles as crop diseases.

However, amongst the plant kingdom, the Orchidaceae stand apart. In no other large family of plants do mycorrhizal fungi occur so abundantly, and in such an easily observable fashion as the Orchidaceae. All orchids so far examined exhibit some dependence on mycorrhiza to a greater or lesser extent, for some part of their life cycle. Terrestrial species, particularly tuberous herbaceous perennials, are a rich source of fungal material. True epiphytes on the other hand show a more limited infection pattern, reflecting in part the rigors of diurnal and seasonal moisture stresses prevalent in the epiphytic environment. Common to both growth forms is a critical dependence in the wild for fungal colonization of the seed. From the investigations that are available it appears that successful seedling development in the wild depends heavily upon reliable infection by a suitable symbiotic fungus. Ensuring satisfactory fungal growth in a niche is one way of habitat selection which provides the orchid with a preformed and functioning "root system". This dependence on fungi for germination was demonstrated in the past when orchid growers strew orchid seed around the base of a parent plant, knowing that the mysterious agent(s) for germination and successful seedling development were somehow inherent in the root system of the mature plant. Even today one can easily observe orchid seedlings developing around a parent plant in the wild. For example, in autumn, seedlings of Pterostylis, seen as protocorm bodies, will be clustered around a parent plant. These small white globular structures, less than 2mm in diameter, are often sandwiched between decaying leaf litter which abounds in beneficial fungal mycelium. When sectioned the protocorms exhibit abundant fungal infection as intracellular fungal coils in outer cells of the convex.

Nutritional supplementation undoubtably is the most important long term benefit of a mycorrhizal association. For the so called leafless achlorophyllous, saprophytic or otherwise holomycotropic terrestrial orchids the nutritional advantage afforded by mycorrhiza is critical to the survival of the plant. *Gastrodia* species demonstrate this dependence by a physical juxtaposition of hyphae with the underground tuber. Moreover, the hyphae often appear to connect to roots of surrounding vegetation as in the case of *Gastrodia* species in New Zealand. A similar relationship verging on parasitism may exist between *Rhizanthella* and the broom honeymyrtle (*Melaleuca uncinata*). Certainly each discovery of a *Rhizanthella* plant is adjacent to a broom honeymyrtle. Collaborative studies with Dr J Warcup of South Australia have also shown that *Rhizanthella* will germinate and grow to maturity only in the presence of both a suitable symbiotic fungus and a living broom honeymyrtle plant. The exact nature of this complex association is being investigated.

Although *Rhizanthella* epitomizes an extreme of fungal involvement with a flowering plant, many green-leaved terrestrial orchids may prove to have, if not bizarre, then certainly an interesting biological association with soil fungi. It is these fungal associations which are to be investigated in this study, building upon the pioneer work of Dr J Warcup and Mr M Clements (Canberra Botanic Garden) on Australian orchids.

The study aims to elucidate the diversity of fungi species associating with Western Australia orchids, including systematics of the fungi involved, consistency with which a fungus species infects an orchid species, seasonality of infection and control of infection by the orchid plant. The study will also investigate the possible evolutionary significance of funguses' specificity by an orchid species, hopefully providing clues as to the factors limiting the distribution of rare species and species with disjunct distributions.

Already a pilot study has been completed and 15 species of early flowering orchids from south west W A have been examined for the presence of mycorrhiza fungi. Where infection is well advanced over 100 isolates have been attempted from 10 of the 15 species. As the season progresses and more orchid species become available, it is hoped that all 150 native terrestrial species will have at least been examined and isolation of the mycorrhiza fungus attempted. The viability and eventual success of the study will depend however on a suitable source of funding becoming available to cover consumables, chemicals, travel and part time assistance required by a project of this magnitude. Granting bodies and private sources are being approached with a view to partial or total funding of the two year project.

Robert Ramsey
Research Officer
CRA Pty. Ltd.

Kingsley Dixon
Research Officer
Kings Park and
Botanic Gardens
Fellow of the University
of Western Australia

NOTES FROM THE 21st ANNUAL GENERAL MEETING

Formal Recommendations to ANOS Council from 1984 ANOS Advisory Committee

1. That both an ANOS Group and an Associated Native Orchid Society be defined within the ANOS Constitution as follows:
    (a) ANOS Group — a society or group having objectives consistent with the ANOS Constitution and formed with the knowledge and approval of the parent body.
    (b) Associated Native Orchid Society — a society or group having objectives consistent with the ANOS Contitution and whose Constitution has been submitted to and accepted by ANOS Council.
2. That ANOS members living in areas where there are no local ANOS Groups be invited to contact other ANOS members in their areas with a view to forming new regional ANOS Groups. Also, that a member of ANOS Council be appointed specifically to implement this recommendation.
3. That ANOS Council take steps to formulate a National Conservation Policy by obtaining copies of current legislation dealing with protected native plants from both Federal and State National Parks and Wildlife Services. Also, that all ANOS Groups and Associated Native Orchid Societies be contacted and asked to provide lists of orchid species considered to be endangered in their respective areas.
4. That ANOS Council contact all ANOS Groups and Associated Native Orchid Societies requesting information about any current breeding programmes being undertaken, including relevant details on individual species, seedlings or flasks available for distribution, future projects, etc. Also, that a member of ANOS Council be appointed to oversee the implementation of this recommendation and the above recommendaiton (No. 3).
5. That ANOS Council appoint one of its members to examine the Minutes of The Society and to extract and prepare a list of all resolutions established over the years dealing with ANOS Rules, Regulations and Policy.
6. That all ANOS Groups be contacted and requested not to judge exotic orchids at monthly meetings.
7. That the ANOS Judging Panel be asked to initiate another Judging Course.
8. That ANOS Council consider the feasibility of producing a joint ANOS/ANOS Group Membership Form, and that such a Membership Form be formulated for consideration by ANOS Groups.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the RHS — from lists in the Orchid Review, May, June, July, August, 1984)

NAME	*PARENTAGE*	*REGISTERED BY*
DENDROBIUM		
Gulginni	Sunglow x *kingianum*	C.J. Brandon
Tarean	Star of Gold x Hilda Poxon	C.J. Brandon
Tully	Wyuna x Sunglow	C.J. Brandon
Burie	*cucumerinum* x *beckleri*	C.J. Brandon
Fairy Floss	Penny Ann x *tetragonum*	W.T. Upton
Goblin	Emmy x Ellen	W.T. Upton
King Leaney	kingianum x Ella Victoria Leaney	C.J. Brandon (J. Ezzy)
Pixie	Ellen x Suffusum	W.T. Upton
Red Baron	Blushing Rose x *kingianum*	W.T. Upton
Twinkle	Penny Ann x *falcorostrum*	W.T. Upton
Warooa	*adae* x Eureka	C.J. Brandon
Allyn Dervish	*canaliculatum* x *stratiotes*	V.F. & N.C. Jupp
Allyn King	Allyn Sands x *undulatum*	V.F. & N.C. Jupp
Allyn Prince	Rachelle Simpson x *undulatum*	V.F. & N.C. Jupp
Allyn Supreme	Allyn Sands x Rachelle Simpson	V.F. & N.C. Jupp
Fay Moore	Rosemary Jupp x *teretifolium*	V.F. & N.C. Jupp
Glenn Wall	*montii* * x *linguiforme*	V.F. & N.C. Jupp
Justin Wall	Lowana Nioka x *speciosum*	V.F. & N.C. Jupp
Natalie Wall	Lowana Nioka x Star of Gold	V.F. & N.C. Jupp
Star Child	Ku-Ring-Gai x Star of Gold	V.F. & N.C. Jupp
Fiesta	Colin x Kim	W.T. Upton
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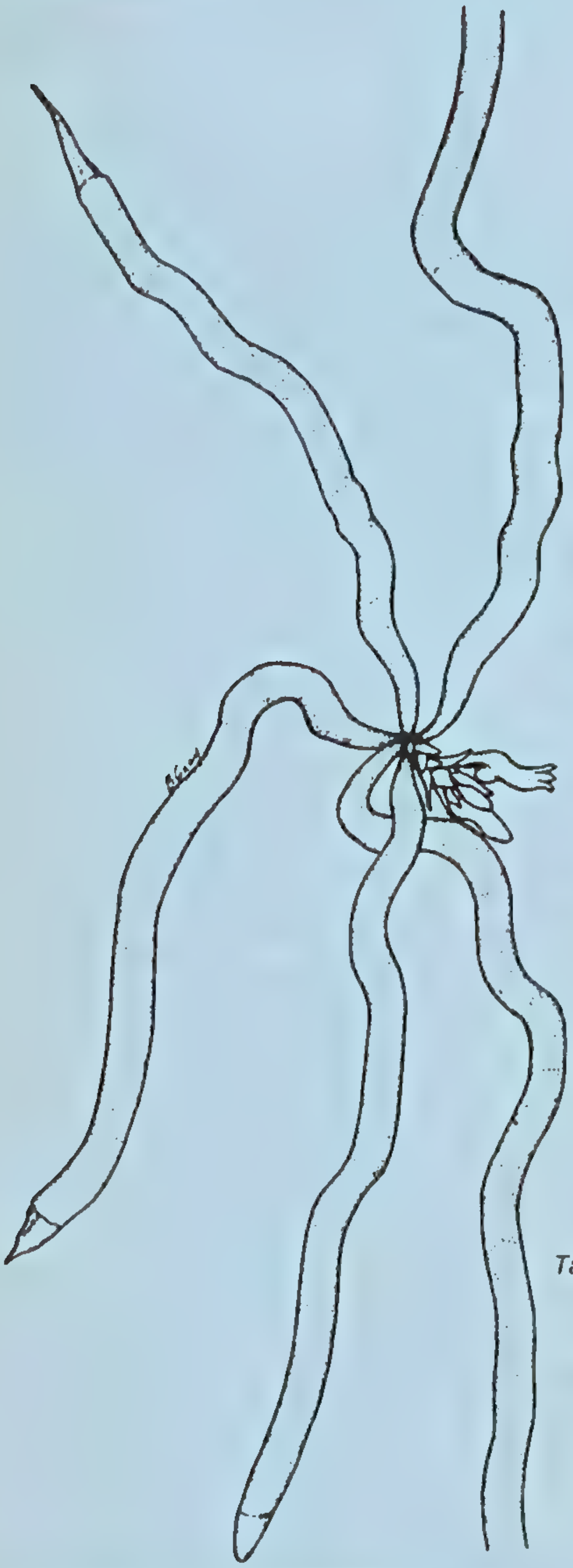

Taeniophyllum confertum

Drawing by B. Gray.

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BOOK REVIEW

by Joe Betts

"Cultivation of Australian Native Orchids" by Helen Richards, Rick Wooton and Rick Datodi. Published by A.N.O.S. Victorian Group, 1984.Illustrations and artwork by Velda Palazzi.

62pp, 21 x 14 mm, soft covers in colour. Recommended retail price $4.00 (plus postage). Available to Groups and societies wholesale in lots of 25 copies — from Don Smith, Hon. Secretary, 6 Beacon Court, Lower Templestowe, 3107.

This is a much improved and expanded version of the Victorian Group's "Native Orchids in Melbourne" published in 1981 and reviewed very favourably in *The Orchadian* for December, 1981 (p. 40). The present publication is in fact a new book, being completely revised and rewritten. It is primarily for growers.

Wisely, the publishers have retained the excellent line-drawings by Velda Palazzi — including the whimsical adornments (ants, miscellaneous pests ranging from snails, scales and grubs through to MAN). The text is eminently readable, in large typeface and chapter headings. New information has been added and chapters have been expanded and rearranged; but the book is still concise and the best yet for new growers of Australian Native orchids.

I felt that the title of the earlier publication ("Native Orchids in Melbourne") was unfortunate; for what was in that booklet was very useful indeed for growers in more northerly latitudes. The new title solves that problem. The sub-title, "with special reference to Melbourne conditions" is perhaps a little overcautious, but the authors are to be congratulated on their invitation of "constructive criticism and suggestions as this book will be regularly revised". This is where members of A.N.O.S. everywhere, whether they are widely experienced growers or just beginners, may help with responses to the invitation.

Finally, the front and back cover designs deserve an appreciative comment. The front cover is filled with a glorious colour photograph by L. Bilney of *Dendrobium falcorostrum.* The back cover carries the brilliant gold of *Diuris aequalis* by Rick Datodi; thus completing the general attractiveness of this fine little book bargain. Nobody should be without a copy.

IN APPRECIATION

Mr J.J. Betts,
33 Memorial Avenue,
St. Ives 2075.

Dear Joe,

ANOS Council wishes to express its most sincere appreciation for your many years of service to ANOS, as President of The Society from 1975 - 1978 and, then, as Editor of The Orchadian from 1977 - 1984. Over the years you have worked tirelessly to further the best interests of ANOS, and I feel certain I speak for all members of The Society when I say thank you.

In particular, your term as Editor, during which time you produced Volumes 6 and 7, brought great credit and international recognition to The Society and confirmed The Orchadian as a world-class botanical journal. Your dedication to this task has been inspiring and the resulting achievement stands as much a monument to your single-minded determination as to your attention to detail.

We trust you will remain an active member and that your vast experience, knowledge and judgement shall continue to be available to ANOS.

With sincere thanks,

Michael Harrison,
Honorary Secretary,
ANOS Council.

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Orchids of the Carabost State Forest (West)

by A.E. Logan

Introduction

Situated about halfway between Holbrook and Tumbarumba in Southern NSW, the Carabost State Forest (West) is an area of dry sclerophyll forest, covering an area of approximately 2000 ha, which straddles part of the dividing range between the Murray River (Southerly aspect) and the Murrumbidgee River (Northerly and Easterly aspects).

The Western aspect of the range forms the headwaters of the Billabong Creek, and while being privately owned, is timbered, and can be easily observed from the Hume Highway at a point 24 km north from Holbrook. Dominant vegetation is various *Eucalyptus* species except for some small areas on the main range, where the shrub story plants, *Stypandra glauca, Calytrix tetragona* and *Brachyloma daphnoides* are dominant.

Soils range from white "pipe" clay on the flats and along creeks, through to heavy clay loams on the slopes; mudstone, schists and shales on the ridges, to granite on the higher parts of the main range.

Jock's Mount is the highest peak, being 732 metres above sea level. Rainfall is 850 mm per annum, mainly during winter and spring, and light snowfalls are not uncommon.

Some of the orchids have been dealt with in other papers (4,5,6,7,) but as the Forestry Commission intends clearing 55% of the area for *Pinus radiata* plantations over the next 8-10 years, I consider this an appropriate time to publish the full list of species I have recorded over the years.

Three species not found in the forest have been recorded from privately owned forested areas within 3 km of the State Forest boundaries, and are included in a secondary list. An asterisk denotes a species represented by a single specimen, or a small colony which has died out since the original recording.

All names used are from "A Preliminary Checklist of Australian Orchidaceae", M.A. Clements, (1) and readers are advised to check that publication for synonyms and comments on name changes. For references to illustrations, unless otherwise stated, see "Orchids of Australia", W.H. Nicholls (2). Genera are listed alphabetically, and species alphabetically within each genus.

Comments on the species

I hope the following comments, and summary of observations/experiments, will help to provide a better understanding of some orchid species. One of the major problems I have encountered, as a layman, is assigning a name to a certain plant, particularly where there is confusion with "weirdo" (as I call them), and intermediate forms linking two or more species. Therefore, in these comments, where I feel it is necessary, attention is drawn to particular plants growing in this area. It is unfortunate that I was unaware of a previous botanical survey being carried out by a Pastures Protection Board veterinary inspector (3), otherwise most, if not all, would have been recorded years ago. The cut-off date for these orchid recordings-observations, is June 30th, 1984.

Dipodium hamiltonianum.

Since the publication of Jones' & Logan's field study of Dipodium hamiltonianum (6), I have received a colour photo of a single flower from a plant of this species growing at Ballandean, Southern Queensland, courtesy Meryven Fletcher (8). This is an excellent close-up photo, and indicates little difference in flower morphology to those growing in this area. The sepals and petals are broader, but the column and labellum are the same. Naturally, no comment can be made regarding the pollinarium.

Caladenia pusilla.

This delightful and diminutive orchid is the latest species to be recorded for the Carabost Forest, when two small colonies were located during October, 1983. Previously known as *C. carnea var. pygmaea.*

Thelymitra aristata.

Several specimens of this beautiful orchid have been recorded over the years from one area of the main range. These specimens are referable to the plants illustrated by Nicholls as *T. grandiflora,* which Clements has listed as a synonym of *T. aristata.* The column midlobe on the flowers match Nicholls' illustration perfectly, and is quite distinct from the column midlobe on the flowers of the *T. nuda-T. pauciflora* group. Flower colour is a clear blue, while the latter tend to have pinkish-mauvey tonings. The leaf of some individual plants can be quite large; measuring up to 50 cm x 5 cm.

Pterostylis foliata

This species continues to occur in the only location so far found (7) with plants that are very similar to the illustrations by J.A.P. Blackmore (9), and W. Brinsley (IO). I consider it depends on habitat whether plants of this species have a basal rosette, or leafy stems similar to Nicholl's illustrations. There is little ground cover where the plants are growing in the Carabost Forest, and they produce a definite basal rosette. Plants growing on the banks of Section Creek, about 1 km above the entrance to T2 power station, where there is an abundance of ground cover, have definite leafy stems. Under these conditions, this is essential, as a basal rosette would not receive sufficient sunlight. Non-flowering plants can have a stem up to 15 cm in length before developing a loose rosette of leaves. Five plants collected from this area (National Parks & Wildlife Service collectors consent form No. P.105, issued 14/11/1974), and grown in pots, immediately formed a basal rosette in cultivation. I only have two of these plants left, and despite repotting in different mixes, none have ever flowered. The area has been kept under observation over the years, but it wasn't until November, 1983, that I found any flowering plants. Until then, I was never certain if they were *P. foliata* or *P. scabrida (alpina),* which always have leafy stems.

Pterostylis furcata.

Plants growing in this area are referable to those illustrated by Nicholls as *P. falcata,* which Clements has listed as a synonym under *P. furcata.* Plants matching Nicholls illustration of *P. furcata* can be found at the Clover Flat Creek rest area on the Khancoban-Cabramurra Road, and the two are not conspecific. After keeping these plants under observation for several years, I have formed the opinion that they are a form of *P. scabrida;* the galea shape being influenced by the habitat in which the plants grow. The differences between species in two *Pterostylis* groups growing in the mountains, is by no means clear-cut. The two groups are; (a) those species with a projecting sinus; ie. *P. obtusa, P. decurva,* etc., and (b) those with a straight or revolute sinus; ie. *P. falcata, P. furcata, P. scabrida,* etc.

Athrochilus huntianus.

To put it bluntly, this plant is an enigma! There is no doubting it's saprophytic form of nutrition, but this differs quite dramatically from the other saprophytes in this area. The two *Dipodiums* and *Gastrodia sesamoides* all have massive underground rooting-storage systems from which to ensure the nutrition of the plant and flowering scape. This does not apply to *A. huntianus,* which, from my observations of plants in this area, appears to have neither tubers nor true roots. The following is a summary of my obserations/experiments with this puzzling plant.

TABLE 1.

Species recorded from the Carabost State Forest (West).

Acianthus.

exsertus
reniformis

Caladenia.

caerulea
catenata var catenata
congesta
dilatata
gracilis
patersonii *
praecox
pusilla

Calochilus.

paludosus
robertsonii

Chiloglottis.

gunnii
reflexa
trapeziformis
X pescottiana

Corybas.

diemenicus
dilatatus
hispidus

Dipodium.

hamiltonianum
punctatum

Diuris.

maculata
pedunculata
sulphurea
sulphurea (peloral form)

Eriochilus.

cucullatus

Gastrodia.

sesamoides

Glossodia.

major

Microtis.

rara *
unifolia

Prasophyllum.

patens var. patens
nigricans

Spiranthes.

sinensis subsp. australis

Thelymitra.

aristata
ixioides var ixioides
nuda
pauciflora
rubra var. rubra

Pterostylis.

alata
curta
decurva
foliata
furcata
laxa
longifolia
nana
nutans
mutica
parviflora
pedunculata
revoluta
X ingens

TABLE 2.

Species recorded from private property.

Athrochilus *huntianus*

Pterostylis *plumosa*

Thelymitra *juncifolia*

The position of the first plant found, which had a single flowering scape, was marked with a small stone. Two flowering scapes emerged from under the stone the next year, and three the following season. After the plants had died, the soil under the stone was examined for tubers, but none were found. Odd scattered single plants were located over a period of 2-3 years, and some of these were also examined for tubers, again without success. Early in 1972, I found a small colony of 22 plants, covering an area of about 200 sq metres, growing on a gravelly ridge on my brother's property. All of these plants were marked, using a metal ring about 1 cm wide, cut from a jam tin. Unfortunately, the exact numbers were not recorded, but over a period of about five years, some of the marked plants grew from within the rings for up to three years, some with two scapes. Others were removed and examined for tubers and/or roots, just as the scape was emerging through the leaf litter, and again neither were found. All young plants examined had a slight swelling at the base of the scape, and a blue-grey filamentous hyphae like growth, which could hardly be called roots. This hyphae like growth could be best described as being similar to that which grows on mouldy bread. At one stage, what appeared to be small tubers were found under the leaf litter within a ring, and these were sent to Mark Clements for identification. Unfortunately, they were only insect galls, presumably from the surfact roots of the *Eucalypt* trees (Clements, pers comm). Over the five year period that the colony was kept under observation, eight plants grew from outside the 22 marked positions. From these experiments/observations, it cannot be claimed that it is a perennial, or at least, a triennial. Where there are more than one flowering scape growing together, they do not grow from a shared base, but are separate plants.

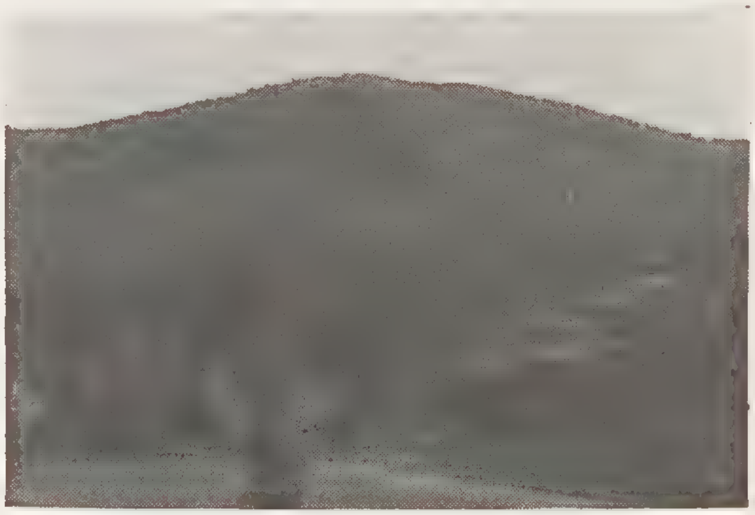
Rotherham has recorded a wasp as the pollinating vector (11), and if the insect is present in this area, it must be very inefficient: only two fertilized flowers have been noted, out of at least a hundred observed over the years. This colony suddenly died out a few years ago, and no plants have appeared in that precise area since. Three years ago the property was sold to a private afforestation company, and the area has now been dozed and planted to pines. The only other place that I know of, where this plant occurs, is adjacent to the Khancoban-Cabramurra Road near the junction of the Wellumba Hill fire trail.

Chiloglottis X pescottiana.

Apparently, from the literature available to me, this plant has been considered to be a hybrid for many years, but has only recently been accepted as such. I am unaware of any paper dealing specifically with it's hybrid status, but from my observations/experiments over the last fourteen years, I am quite convinced that it is a natural hybrid. During the early 1970s, after locating this plant in the Carabost Forest (5), I cross-pollinated large numbers of *C. trapeziformis* and *C. gunnii* flowers, with the result that after three years, plants of *C. X pescottiana* appeared in colonies of *C. trapeziformis,* but none have appeared in colonies of *C. gunnii.* The only instances where *C. X pescottiana* appear with *C. gunnii* is where *C. gunnii* and *C. trapeziformis* grow intermingled. In colonies of pure *C. gunnii,* where flowers have been fertilized with pollen from *C. trapeziformis,* capsules with seed are formed, but no plants of *C. X pescottiana* have ever appeared. Apparently the cross is *C. gunnii* (male) X *C. trapeziformis* (female), but why the reverse cross appears to be infertile, is something I cannot explain. Natural barriers as detailed by Stoutamire (12) may be the reason. Plants of *C. X pescottiana* do not persist in any one precise position, dying out after 3-4 years. However, other plants appear elsewhere, indicating that constant crossing is required to maintain a population in the wild. By comparison, *C. X pescottiana* does well in cultivation, multiplying vigorously; why it does not do the same in the wild requires further investigation. The pollinating vector is a small orange-brown insect, which I assume to be a Thynnid wasp (13). When using flowers of *C. trapeziformis* and *C. X pescottiana* as "bait" in a warm, sunny position, the insects approach from downwind in a zig-zag fashion as described by Stoutamire (12) before alighting on the flower. They would investigate the labellum callii with evident interest before, either, flying away, or grasping the labellum margins with their legs, and attempting to fly off with it. When this occurred, the insect would be thrown against the column and pollen removed. It is not unusual to have up to four insects on a flower of *C. X pescottiana* at the same time, but they do not seem quite so enthusiastic with *C. trapeziformis.* I have never had an insect alight directly on the flower when using *C. gunnii* as "bait". They would land on the grass about 5-10 cm from the plant, where they would hop around for a few seconds before flying away or alighting on the labellum. Only a few insects have been attracted to the flowers of *C. gunnii,* and no observations were made of any attempts to fly off with the labellum, or pollen being removed as the insects investigated the labellum callii (12). Considering the size of the insect, and the width of the labellum of *C. gunnii,* I think the insect would be stretching it's legs somewhat in any attempt at grasping the labellum margins and flying off with it. Therefore, how the pollen is removed from flowers of *C. gunnii* is something I have yet to determine. I have observed insects "cruising" over flowering colonies of the three species involved, early on a warm sunny morning, but never observed them on flowers *in situ.* Despite their interest in flowers of *C. X pescottiana,* no indication of back-crossing and the production of hybrid swarms has been observed. The majority of *C. gunnii* plants in the Carabost Forest have greenish-brown flowers, but one small colony, of about 10-12 plants, have flowers that are a deep reddish-plumy colour. Occasional plants of *C. X pescottiana,* with dark coloured flowers, occur within 20 metres of this colony, indicating their relationship with this dark coloured form of *C. gunnii.* Whether this colour form attracts a different pollinating vector is an aspect of the plants ecology that I have not investigated. Due to the scarcity of flowers, I have not interfered with the colony in the hope that plant numbers will increase. A colour photo of *C. X pescottiana* appears in "Flowers and Plants of N.S.W. and Southern Queensland." (14) with the statement that it is a natural hybrid between *C. gunnii* and *C. cornuta.* This is incorrect; particularly if it refers to the plants in the Carabost Forest. A comparison photo of the three species involved, has been published in "Australian Plants" (15). *C. gunnii* and *C. cornuta* are involved in the area where specimens of *C. X pescottiana* were collected at Mt. Barrow in Tasmania (2), and those specimens could well be a *C. gunnii* X *C. cornuta* cross. The only occurrence of *C. cornuta* that I know of is near the Clover Flat Creek rest area, and no attempt has been made to study the species ecology in that area. Both *C. gunnii* and *C. trapeziformis* are present at several locations where *C. X pescottiana* is found in Victoria (Ruth Clarke pers comm), except for one occurrence at Mallacoota where only *C. trapeziformis* is present (16).

Conclusion

The above list represents the orchid component of the flora of the Carabost State Forest (West), and of the district as a whole. Some of the species will be eliminated from the Forest area with clearing, mainly those represented by a few colonies and/or restricted in distribution to the gravelly ridges, and not represented in the granite soils. Species that will definitely be eliminated are, *Caladenia pusilla, C. congesta, C. cucullata, Pterostylis nana, Thelymitra nuda, T. rubra var. rubra, Prasophyllum patens var. patens, Chiloglottis reflexa* and *Diuris sulphurea* (peloral form). Others that may be eliminated are, *Pterostylis foliata, P. longifolia, Acianthus exsertus, Prasophyllum nigricans* and *Thelymitra aristata.* Some of the above have been recorded from privately owned forested areas, and will continue to represent the district orchid flora, providing those areas are not sold to private afforestation companies. *Athrochilus huntianus* and *Thelymitra X juncifolia* have already been lost in this manner.



Jock's Mount, Carabost State Forest

Discussions with the Tumbarumba Sub-district Forester has indicated that the Commission would consider leaving an area of about 2 ha where *Chiloglottis X pescottiana* occurs, to preserve this rare hybrid.

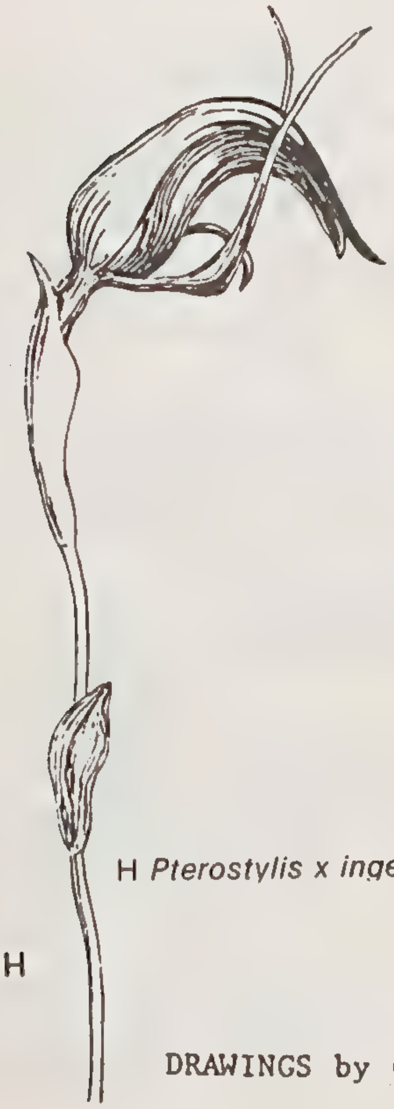
Acknowledgements

I wish to extend my sincere thanks and appreciation to the following authorities and individuals for their assistance over the past 25 years. The N.S.W. Forestry Commission for permission to collect plant specimens in the Wagga Wagga, Tumut, Batlow and Tumbarumba Forestry Sub-districts. The National Parks and Wildlife Service for permits to collect plant specimens in areas under Service control, and for licenses to collect protected flora for scientific purposes. The staff at the N.S.W. National Herbarium, particularly Don McGilvray and Don Blaxell, for identification of plant specimens. Lastly, to David Jones, Steve Clemesha and Mark Clements for their correspondence and companionship, helpful comments and discussions during field trips.

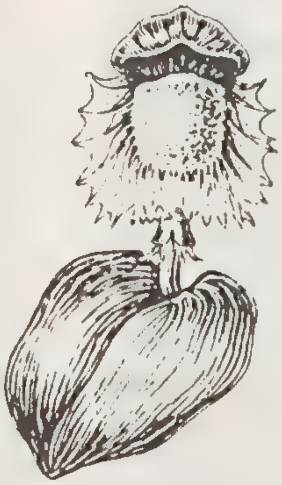
References

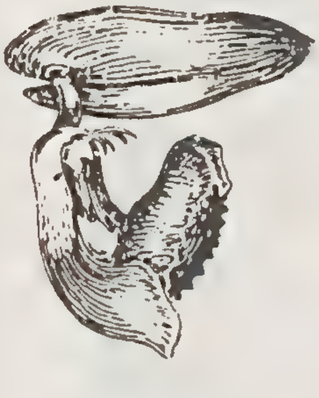
1. Clements, M.A. "A Preliminary Checklist of Australian Orchidaceae". National Botanic Gardens, 1982.
2. Nicholls, W.H. "Orchids of Australia". Thomas Nelson (Aust.) Ltd. 1969.
3. McBarron, E.J. "An Enumeration of Plants in the Albury, Holbrook and Tumbarumba Districts of N.S.W.". Contributions from the N.S.W. National Herbarium, 2; 8-247, 1955.
4. Clemesha, S.C. "*Pterostylis acuminata var ingens* in N.S.W." The Orchadian, 3; 66, 1969.
5. Logan, Alan. "A New Recording for *Chiloglottis pescottiana*, R.S. Rogers". The Orchadian, 3; 160-163, 1971.
6. Jones, D.L. & Logan, A.E. "A Field Study of *Dipodium hamiltonianum*, F.M. Bailey, in Southern N.S.W." The Orchadian, 4; 2-6, 1971.
7. Logan, A.E. "Recent Riverina Recordings". The Orchadian, 7; 17, 1981.
8. Fletcher, Meryven. "Girraween — Place of Wildflowers". The Orchadian, 5; 120, 1977.
9. Blackmore, J.A.P. "Three Additional Records for N.S.W." The Orchadian, 2; 76-77, 1967.
10. Brinsley, W. "*Pterostylis foliata* Hook f, in N.S.W." The Orchadian, 3; 66-67, 1969.
11. Rotherham, E.R. "Pollination of *Spiculea huntiana*, (F. Muell) Schltr." The Orchadian, 2; 120-121, 1967.
12. Stoutamire, W. "Australian Terrestrial Orchids, Thynnid Wasps and Pseudocopulation". American Orchid Society Bulletin, 44; 13-18, 1974. (Reprint; The Orchadian, 6; 110-111, 1979.)
13. Stoutamire, W. "Pseudocopulation in Australian Orchids." American Orchid Society Bulletin, 44; 226-233, 1975. (Reprint; The Orchadian, 6; 126-129, 1979.)
14. Rotherham, E.; Blaxell, D.; Briggs, B.; Carolin, N. "Flowers and Plants of N.S.W. and Southern Queensland." Reed, 1982.
15. Jones, David L. "Cultivation of the Genus, *Chiloglottis*." Australian Plants, 6; 172-174, 1971.
16. Clarke, Ruth. "Orchids of the Gippsland Coast." Victorian Naturalist, 94; 20-25, 1977.

A.E. Logan
"Wodara"
Carabost
Wagga Wagga NSW 2650

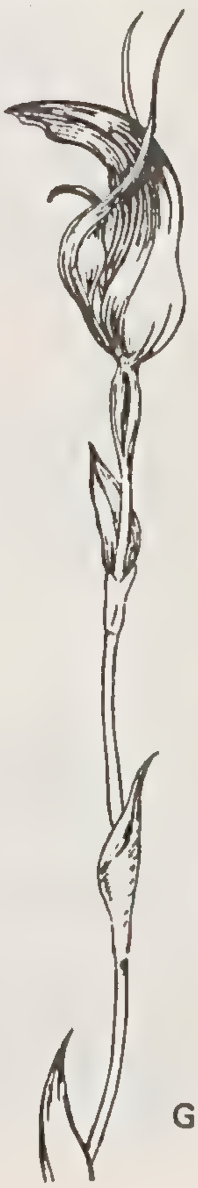


H *Pterostylis x ingens x 1*





N *Corybas dilatatus* x1
O *Corybas diemenicus* x1



G. *Pterostylis foliata x 1*

DRAWINGS by Collin Woolcock

Aerides Lour., An Orchid Genus New to Papua New Guinea

by Eric A. Christenson

The *Aerides odorata* complex and in particular *A. odorata* Lour. and *A. quinquevulnera* Lindl. are common, weedy species growing from sea level to 1500 metres. They favour disturbed habitats and frequently grow on street trees, especially *Ficus, Manfifera* and *Tamarindus* (Laycock 1932; Comber, pers. comm. 1982), where spatial isolation of the host plant maintains a stable high light environment. *Aerides* species typically set abundant fruit yielding large quantities of seed. In this regard they resemble the closely related *Rhynchostylis retusa* (L.) Bl. Of the orchidaceous elements of the Malaysian flora, *Aerides* is well adapted for long distance dispersal and colonization.

There has never been a record for *Aerides* in New Guinea although this widespread genus is known from India through southeast Asia and every major island to the west of New Guinea including the Philippines. During my preparation of a taxonomic revision of the genus, several people familiar with the ecology and habitats of New Guinea expressed the belief that it should grow there or at least there was no reason why it should not.

I visited the Herbarium of the Office of Forests, Division of Botany, at Lae with the hope of finding *Aerides* specimens among the undetermined material. A search of the rich collections at Lae revealed no herbarium specimen of *Aerides*. However, Neville Howcroft told me he had seen *Aerides* material collected by amateur enthusiasts in the Dumpu region toward Madang. As luck would have it, an *Aerides* was in flower in the greenhouses of the Lae Botanical Garden. The plant was collected in the Naru logging area of Madang adjacent to the locality reported by Howcroft.

Examination of the plant shows it to be *Aerides quinquevulnera* Lindl. previously considered endemic to the Philippines. Several taxa normally considered Philippine occur in the Dampu region (Howcroft, pers. comm. 1984). The presence of *A. quinquevulnera* reinforces this observation.

The taxonomy of *A. quinquevulnera* is presented here:

Aerides quinquevulnera Lindl., Sert. Orch. *t. 30.* 1838.

TYPE: *H. Cuming s.n.*, K! (Herb. Lindl., mounted on proof of Sert. Orch. *t. 30*).

Aerides fenzliana Reichb. *f.*, Hamb. Gartenz. 16:282. 1860.

TYPE: *H. Cuming 2143,* Philippines, W!, BM!, G (2)!, K (3)!, P!

Several colour forms have been described which are not detailed here as the New Guinea specimen examined agrees with Lindley's plate having white flowers with purple blotches and spotting. (See colour pages.)

Specimen examined:

M. Galore, A. Ninjo and M. Kapu s. n. (Hort. Acc. 10205), Papua New Guinea, Naru logging area, Madang, collected 15 Nov 1978, flowering in cultivation at Lae 10 Aug 1984. CONN (spirit)!, LAE (spirit)!.

Acknowledgements

I would like to thank Dr E.E. Henty, Curator, for allowing me access to materials at LAE and N. Howcroft for his hospitality and comments.

Reference:

Laycock, J. 1932. Orchids in Celebes and the Moluccas. Malayan Orchid Review (reprinted in Malayan Orchid Review 8(1):18-20. 1965).

Editor's footnote

The Latin name signifies "five wounds" which appear in the photograph as blood stains on each floral segment.

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13 September, 1984

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The Native Cymbidium Species of Papua New Guinea

by T.M. Reeve

Until recently there has been little information available on the number of New Guinea *Cymbidium* species or their correct names. Especially lacking has been any further record or clarification of the status of the only endemic species, *C. papuanum*. This present paper is being written to update the article published by J.J. Wood in the British *Orchid Review* in 1977, and to provide a key with descriptions of the three known species in Papua New Guinea including also new information and colour photographs of *C. papuanum*.

Although some very early collections of *Grammatophyllum* were wrongly assigned to *Cymbidium*, the first genuine record of the genus in New Guinea was Rudolf Schlechter's publication of *C. papuanum* in 1913. This new name was based on a single collection, in 1908, from the Bismarck Mountains in the Highlands of Papua New Guinea, the locality being not far north of where the town of Goroka stands.

In 1952 Norman Cruttwell collected a second species in the Milne Bay Province, but its correct name was not clarified until 1977 when Jeffrey Wood of the Kew Herbarium identified it as *C. ensifolium*. Originally named by Linnaeus, this species has been collected in several parts of P.N.G. and has a very wide distribution extending to China.

Over recent years further new collections have been made of the endemic *C. papuanum* in several localities and this has confirmed its status as a distinct species.

Finally, in 1981, a third species was discovered at Paiela in the Enga Province by two fieldworkers with the Department of Primary Industry — Malingi Ekape and Tekepe Piwiya. When these plants flowered in 1982 the species was identified as *C. lancifolium*, another very widespread orchid with approximately the same range as *C. ensifolium*.

All of the three New Guinea species are terrestrial growing in humus, usually under *Castanopsis* forests (primary or secondary), and occur in the lower montane zone between 500 and 2000 metres above sea level.

Key to the New Guinea species of Cymbidium

1. Plant 35-100 cm tall with linear leaves .... ***C. ensifolium***
1. Plant 5-40 cm tall with lanceolate or elliptic leaves 2
2. Leaves 10-45 cm long; lip apex without an upturned hook .... ***C. lancifolium***
2. Leaves 4-10 cm long; lip apex forming a small upturned hook .... ***C. papuanum***

1. ***Cymbidium ensifolium*** (L.) Sw. in *Nov. Act. Soc. Sc. Upsal.* **vi:** 77 (1799).
Basionym: Epidendrum ensifolium Linnaeus in *Sp. Pl.* 954 (1753).

Tall terrestrial *herb* up to 100 cm high, without distinct pseudobulbs. *Roots* thick, white, up to 6mm diameter. *Leaves* 3-4, sessile, erect to somewhat recurved at the top, linear gradually tapering to a point at the apex (ensiform), with 3 prominent nerves on the lower surface, margins finely but noticeably serrated, 30-100 x 1-2.5 cm. *Racemes* erect, 25-70 cm long, with 2-7 flowers near the top; *peduncle* 20-60 cm; *rhachis* 5-16 cm. *Flowers* light green to yellow, usually with 5 red lines on the sepals and up to 7 lines on the petals, labellum yellow with coalescing red dots on top. *Sepals* 22-25 x 5-5.5 mm; *petals* 18-20 x 5-7.5 mm. *Labellum* 16-20 x 7-9 mm (up to 12 mm wide when expanded), usually with the apex rolled underneath. *Ovary/pedicel* 25-40 mm long; fruits erect, triangular.

Distribution: Within Papua New Guinea, *C. ensifolium* is found from the Milne Bay Province through to the Southern Highlands Province from 500 to 1300 metres a.s.l. This species also grows in Indonesia, through SE Asia to India, China and Japan at elevations 700 to 1300 m.

Details of the P.N.G. collections are as follows:

Milne Bay Province: Cruttwell 367 June 1952.
Morobe Province: Millar NGF 12293, 18890 April 1961, Jan. 1964; *Hartley* 11572 April 1963; *Streimann & Kairo* NGF 39369 April 1969; *Sands, Pattison, Wood & Howcroft* S. 1850 Sept. 1975.
Southern Highlands Province: Lake Kutubu, *Reeve* 1174 Nov. 1982.

Notes: *C. ensifolium* is quite a handsome species, and is readily recognised by its long narrow leaves which have finely serrated edges. It usually grows in the decomposing litter in primary or secondary oak forest where there is a reasonable amount of light.

This widespread species is well known in cultivation. During a patrol in the Southern Highlands, P.N.G. in 1982, some plants were carried for a period of 3 weeks before being transplanted into leaf mould at the base of a big *Castanopsis* tree at Erave (1100 m). They established quite readily without ever looking back and flowered a few months later. From the collection dates on herbarium specimens there seems to be no fixed season for flowering in Papua New Guinea.

2. **Cymbidium lancifolium** Hook. in *Exot. Fl.* t. 51 (1823-27).

Terrestrial *herb* up to 40 cm high. *Roots* thick, smooth, white up to 7 mm diameter. *Pseudobulbs* distinct, subterete, greenish, up to 15 x 1.5 cm. *Leaves* 3-5, with long petiole (uppermost leaf with longest stalk), elliptic to lanceolate, acute to acuminate, 10-45 x 1.5-4.5 cm. *Racemes* erect to slightly spreading, to 30 cm long, with 3-8 flowers; *peduncle* to 15 cm long. *Flowers* pale greenish to creamy in colour with maroon spotting on the inside of the petals and on the labellum and column. *Sepals* 20-25 x 5-6 mm; *petals* shorter and wider. *Labellum* 15-18 x 7-8 mm with paired fleshy keels at base apex rolled under. *Ovary/pedicel* 20-30 mm long.

Distribution: In New Guinea *C. lancifolium has been collected only in the Paiela area of the Enga Province from 1300-1500 m. See *Footnote. Rees & Reeve* 391 (K, LAE); *Reeve* 702 (AMES, CBG, E, K, L, LAE, NSW).

Like *C. ensifolium* this species has a very widespread distribution from P.N.G. through South East Asia to India, China and Japan, growing at 900-1500 m.

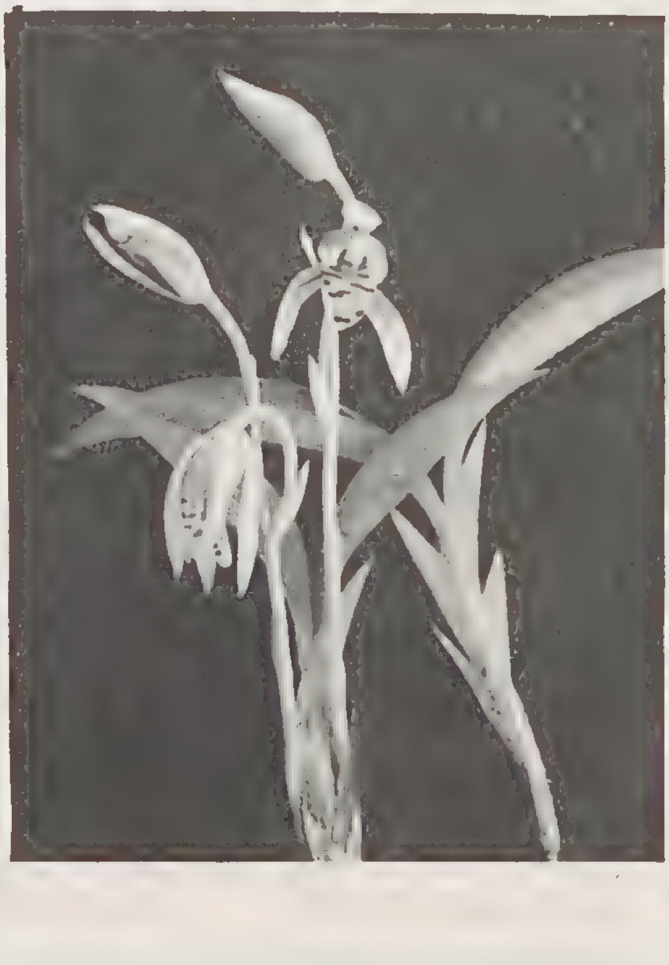
Notes: In its only known locality in P.N.G., *C. lancifolium* grows as a terrestrial amongst leaf litter under *Castanopsis* forest, often on quite steep slopes along the sides of the Pagupiale Valley at Paiela. Even though all the New Guinea species of *Cymbidium* are terrestrials, they do have the typical epiphyte requirements of good air movement as well as sufficient light to grow and flower successfully.

The main flowering time noted for this species is in the drier season, around May to August. However it will probably be shown that it flowers at other times as the seasonal variations are often minimal in the Central Highlands of New Guinea. At Laiagam this species performs reasonably well in pots with pure sphagnum moss, but no doubt a regular Cymbidium mix would be better. At the Royal Botanic Gardens, Kew, Chris Bailes grows it well in their standard mix of bark, peat and perlite, and one of the New Guinea plants was in flower there in May 1984.

3. **Cymbidium papuanum** Schltr in *Fedde Rep. spec. nov. regni veg. Beih.* 1: 953 (1913) et in *Beih.* 21: Tafel CCCXXXVI, Fig. 1296 (1928).

Small erect terrestrial *herb* up to 18 cm high, with inflorescences projecting above the leaves. *Roots* thick, smooth, white up to 5 mm diameter. *Rhizomes* underground or rather, in the leaf litter, sometimes very elongated, fleshy, covered with short hairs, 4-5 mm diameter with nodes 8-17 mm apart. *Pseudobulbs* small, semi-terete, 20-50 x 2.5-4 mm with nodes 3-7 mm apart; new stems covered with leaf-like bracts and each with 1-3 (-4) leaves at the apex (commonly 2-leaved). *Leaves* shortly petiolate, spreading, elliptic to lanceolate, acute to acuminate (-apiculate), 4-10 x 1.0-2.4 cm. *Racemes* erect, to 15 cm long, with 1-4 flowers; *peduncle* 3-10 cm long; *rhachis* 1-5.5 cm long. *Flowers* upright or nodding, glabrous, often not widely opening, c. 2-3 cm diameter; pale greenish-cream to creamy yellow, sepals with central red striation inside, petals and labellum striated and spotted red. *Sepals* narrow, 17-23 x 2.5-3.5 mm; *petals* slightly shorter but broader, 15-18 x 5.5-7 mm. *Labellum* channelled in lower half, apical section often reflexed but always with apex turned upwards to form a small hook, 15-17 x 7-9 mm

(**Note:** It is difficult to account for the attenuated shape in the upper half of the lip in Schlechter's original illustration. Possibly the Type was a slightly aberrant form.) *Column* narrow, to 12 x 2.5 mm dilating slightly at the base to 3 mm broad, yellow suffused with red. *Ovary/pedicel* to 20 mm long.



Cymbidium papuanum collected at Nondugl, Western Highlands Province, P.N.G. in May 1980 (*Reeve* 437). The inflorescences project above the leaves in this species and the flowers are often nodding.

Distribution: Of the three native species in New Guinea *C. papuanum* alone is endemic. It also grows at higher altitudes than the other two species. So far it has been recorded from the Milne Bay, Madang, Eastern Highlands, Chimbu, Western Highlands and Southern Highlands Provinces from 1350 to 2000 m.

Details of the collections in herbaria are as follows:
Milne Bay Province: Rabaraba District, Mt Duau above Agaun (9°58′S; 149°12′E), 1360 m, Feb. 1973, *P.F. Stevens* LAE 58147 (K, LAE).
Madang Province: (? Bundi District), Bismarck Mountains, 1600 m, Nov. 1908, *Schlechter* 18680 (B, destroyed).
Eastern Highlands Province: Goroka District, Mt Gahavisuka, 2000 m, Dec. 1981, *Cruttwell* 2075 (LAE and to be distributed elsewhere); Jan. 1983, *Cruttwell* 2247 (LAE); May 1983, *Cruttwell* 2379 (LAE).
Chimbu Province: Chuave District, Kenangi, 1700 m, Sept. 1979, *Reeve* 805 (LAE).
Western Highlands Province: Minj District, Nondugl, 1500 m, May 1980, Sept. 1983, *Reeve* 437 (CBG, E, K, L, LAE, NSW).
Southern Highlands Province: Koroba District, Mt Waiyape, 1800 m, July 1980, *Reeve* 804 (LAE).

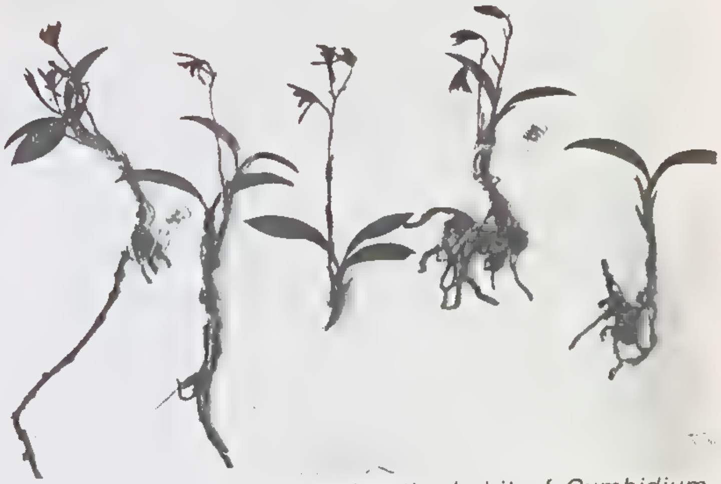
Notes: Schlechter's original description was based on a single plant which unfortunately has since been destroyed. But now that new collections have been made and a fuller description can be issued, it is clear that *C. papuanum* is a distinct species. This miniature orchid differs from *C. lancifolium* in the much smaller size of the plants, in the proportionately longer inflorescences which project above the leaves, in the tendency of the flowers to droop, as well as the hooked apex of the lip. Figures 1 and 4 illustrate well, in pressed specimens, most of these distinguishing features.

C. papuanum is commonly found growing in the humus from leaf litter in *Castanopsis* (New Guinea oak) forests. It usually has long rhizomes creeping through the humus, and, according to Norman Cruttwell (pers. comm.), the plants often die back. When not in flower this species is quite insignificant and probably has been overlooked by many collectors.

As the photographs show, *C. papuanum* can be attractive if the flowers open widely. So far it has not been cultivated successfully, mainly due to the lack of planting material. However, in September 1983, more plants were collected at Nondugl and are now being cultivated at Laiagam. Flowering appears to be non-seasonal in Papua New Guinea.

Reference:

Wood, J.J. (1977). The Genus *Cymbidium* Sw. in New Guinea. *Orchid Review* 85 (1005): 94-96 (English); *Die Orchidee* 28: 170-172 (German).



Sheets at LAE herbarium showing the habit of *Cymbidium papuanum*. Reproduced by permission of the Assistant Director, Division of Botany, Lae.

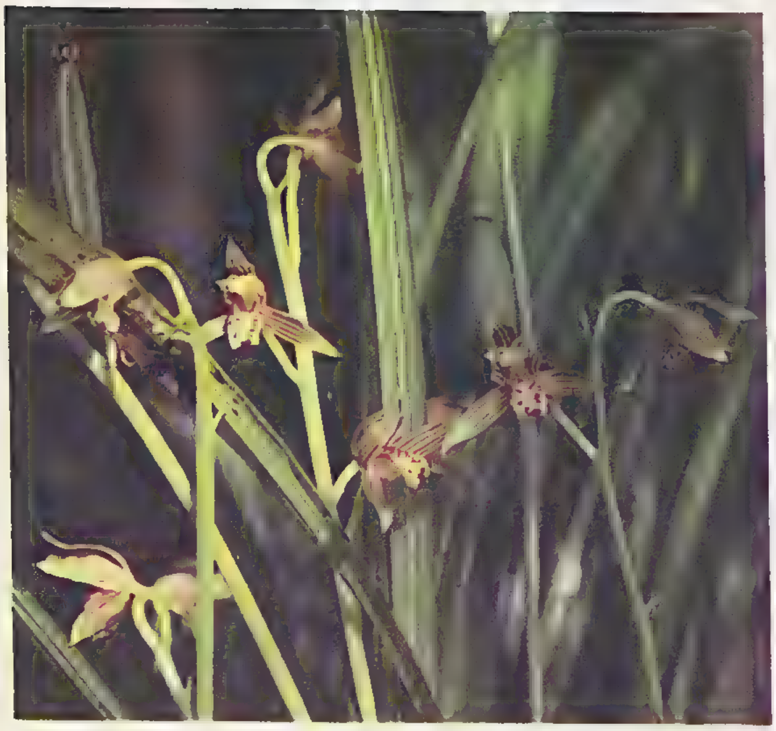
***Footnote:** Since this manuscript was prepared another new name for New Guinea has come to my attention: *Cymbidium robustum* Gilli in *Annals of the Natural History Museums, Vienna,* 84/B: 22-23 (1983). The Type (*Gilli* 546), collected at Kompiam (1650 m), Enga Province, P.N.G. in February 1974, is deposited in the Vienna Herbarium so it will be difficult to check. From the description, this new species is almost certainly synonymous with *C. lancifolium* Hook. The plants were large with leaves up to 50 x 5 cm, and with 5-10 flowers on scapes 30-35 cm long.

Dr Gilli has described 32 new species of orchids in this recent paper; all collected during a visit to the Papua New Guinea Highlands in 1974. It is apparent that he has not looked carefully at earlier descriptions, in particular J.J. Smith names, with the result that most of these new names will prove to be conspecific with earlier described taxa. With no duplicates deposited in readily accessible herbaria, this just makes extra work for the already overburdened taxonomists working on the New Guinea flora.

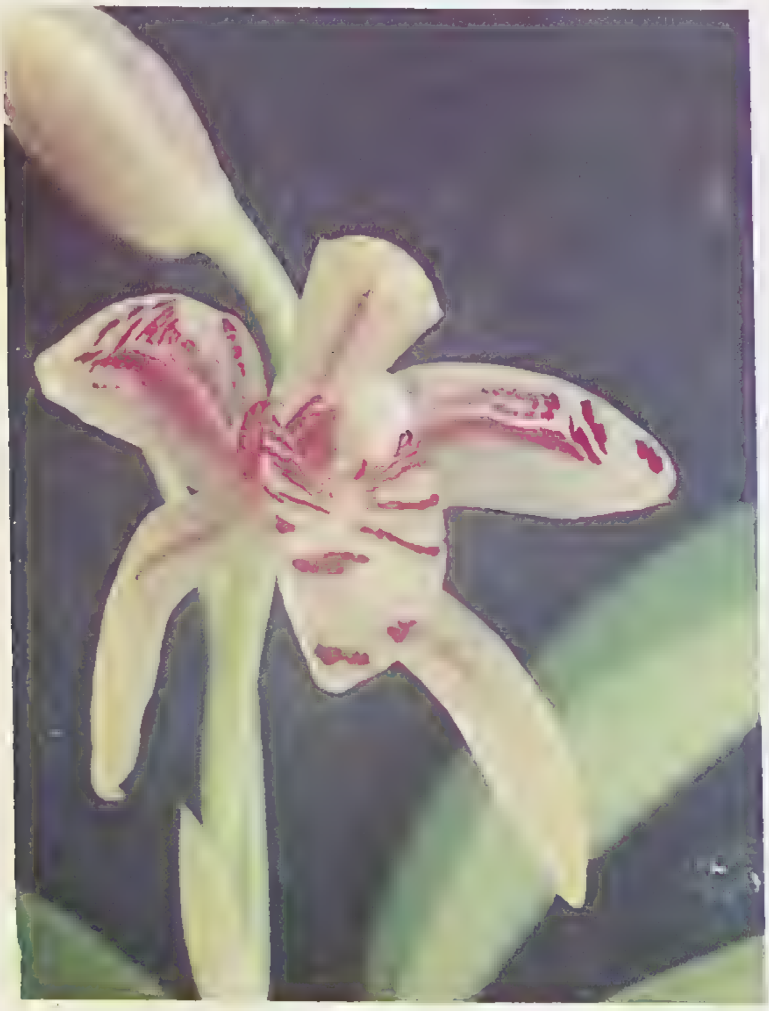
T.M. Reeve
Department of Primary Industry
Laiagam
Enga Province
Papua New Guinea

May, 1984

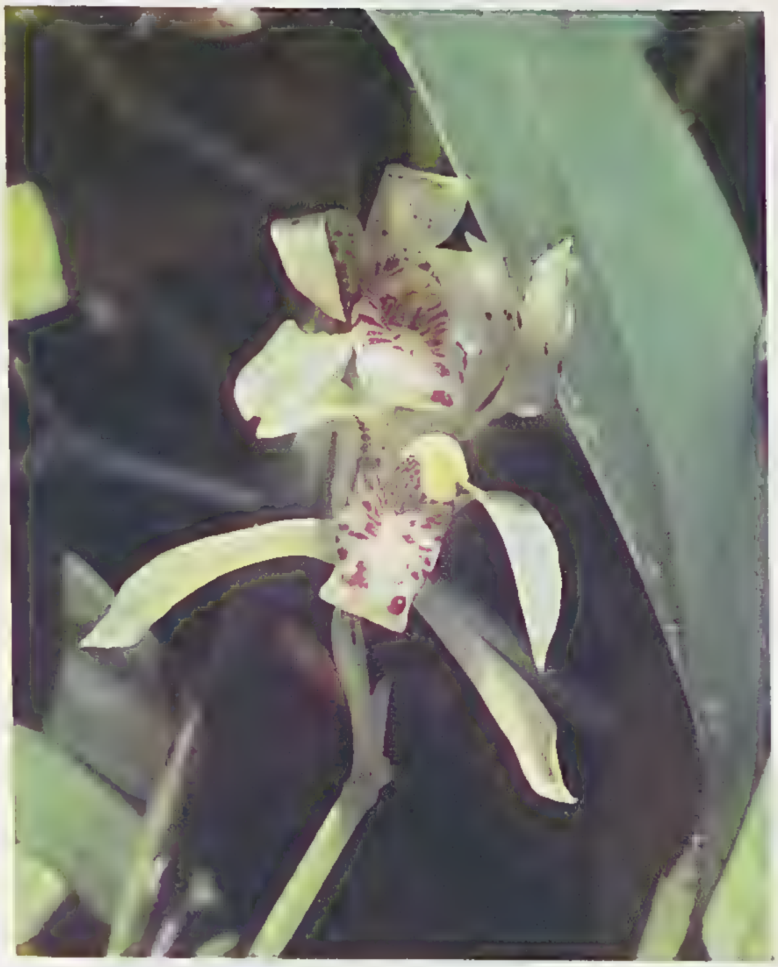
Papua New Guinea Cymbidiums
T.M. Reeve



Cymbidium ensifolium growing in old gardening land under secondary regrowth on the edge of Lake Kutubu, Southern Highlands Province, P.N.G. (*Reeve* 1174).

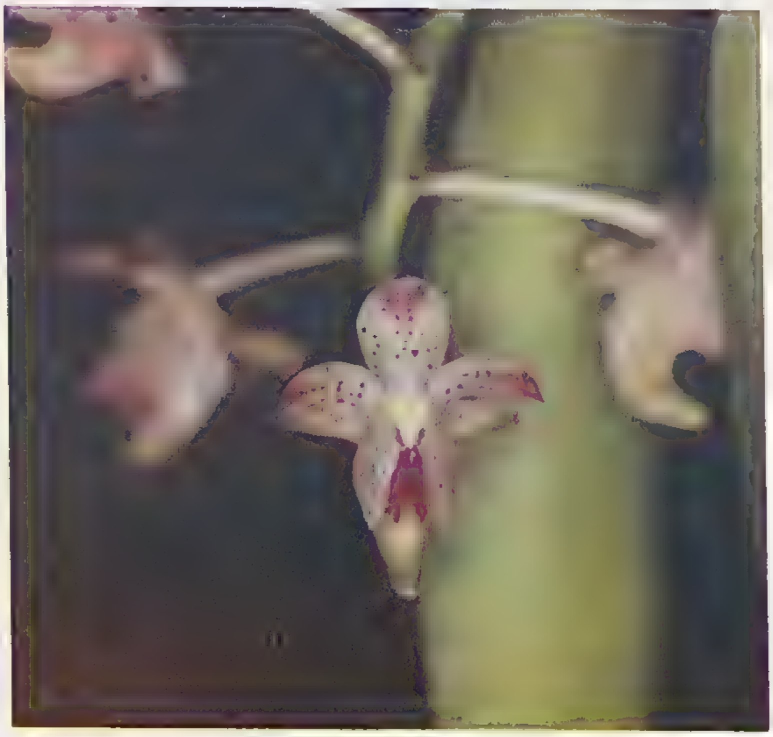


Cymbidium papuanum collected at Nondugl, Western Highlands Province, P.N.G. in May 1980 (*Reeve* 437). The inflorescences project above the leaves in this species and the flowers are often nodding.



Cymbidium lancifolium in cultivation at the Highland Orchid Collection, D.P.I., Laiagam (*Reeve* 702).

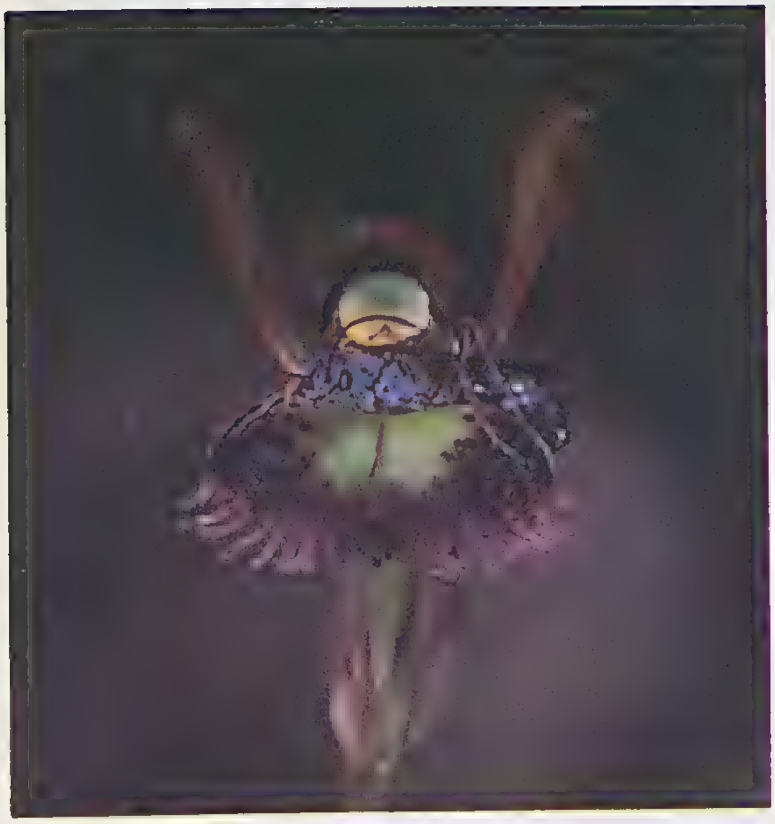
A New Species for Papua New Guinea
E.A. Christenson



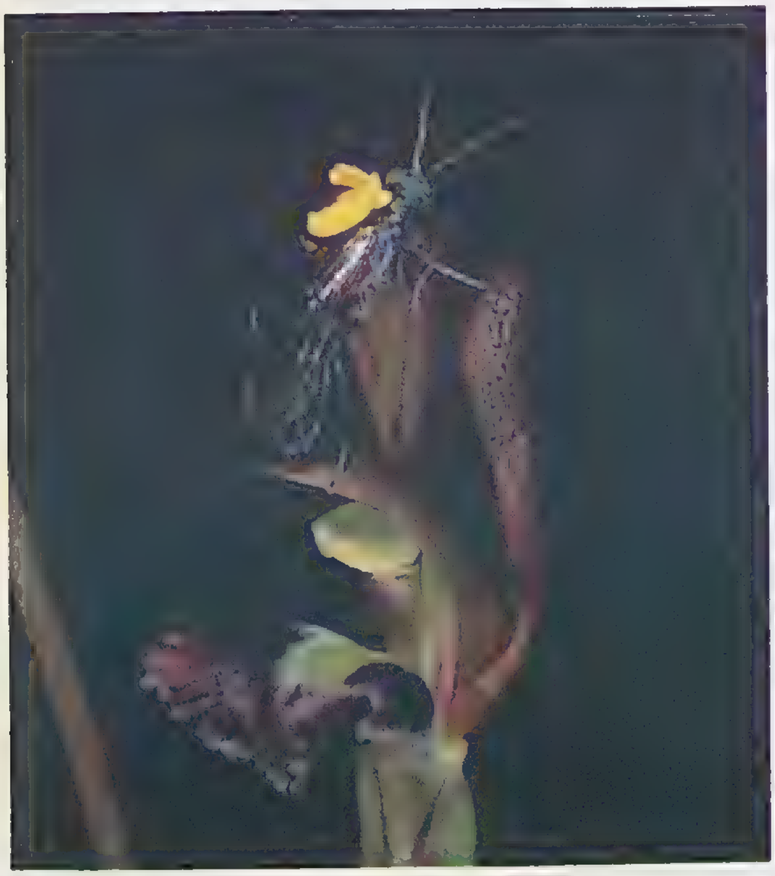
Aerides quinquevulnera Lindl.
Madang, Papua New Guinea;
Photo by E. Christenson

Leporella fimbriata

R. Peakall



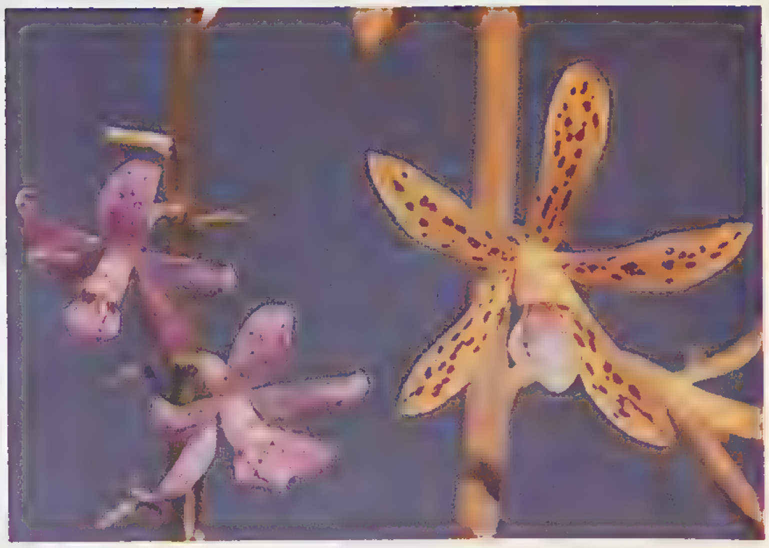
Departure from the labellum after 3-5 minutes is proceeded by a slight twist which enhances contact between the insects thorax and pollinia in one side of the anther. Size and colouration of the labellum is a probable mimic of the queen ant which is larger than the male.



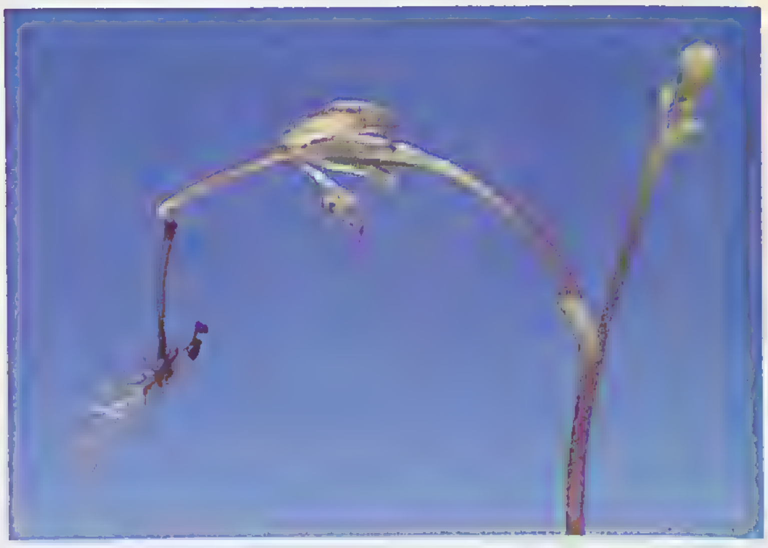
Following departure from the labellum the insect moves to the dorsal sepal and petals. N.B. Pollinia on the ant's thorax and pollen on the stigma.

Orchids of the Carabost State Forest

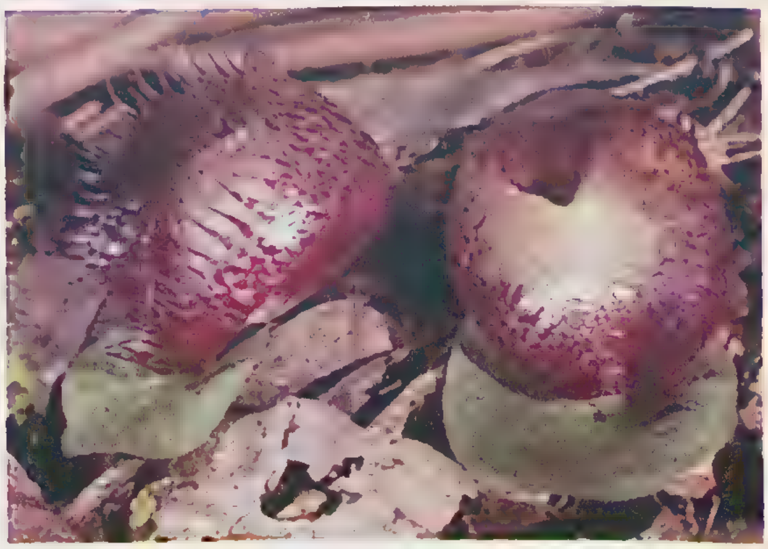
A.E. Logan



Comparison photo of *Dipodium punctatum* (left) and *Dipodium hamiltonianum* (right).



Athrochilus huntianus



Corybas hispidus

A Survey of the Orchids of the Illawarra District

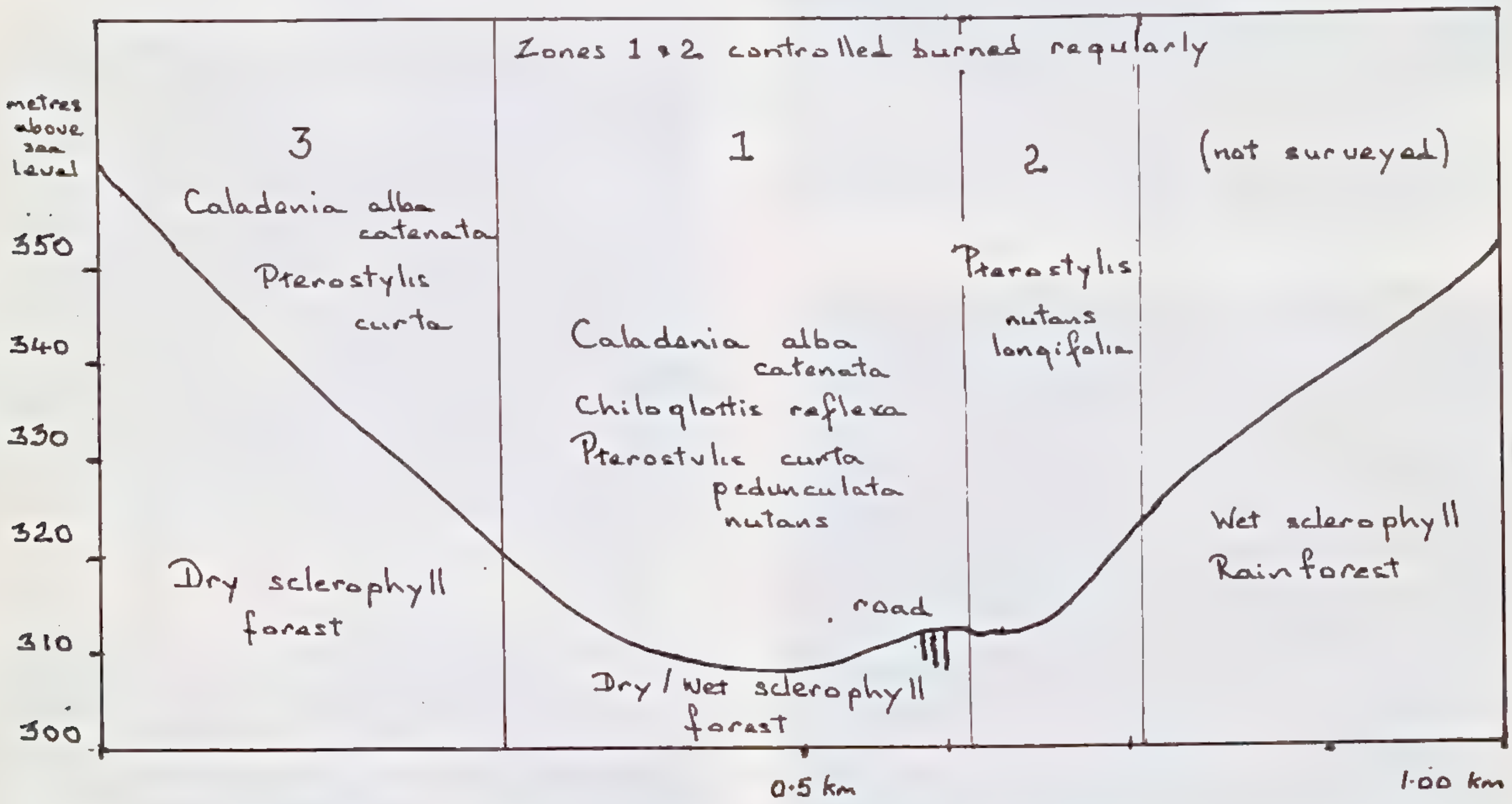
Conducted by Wollongong & District Native Orchid Society.

During 1983 Water Board areas adjacent to the Illawarra region were surveyed. The areas selected were easily accessable and represent the first tentative steps in a long term project covering a vast area which includes many different habitats.

The two areas surveyed in 1983 will need to be revisited to confirm the original sittings of orchids which were not in flower or to make positive identification where doubt exists. In regard to identification and recording of orchids found, a herbarium record of orchids found in the Waterboard (and elsewhere in the Illawarra) is being considered, providing permission from the relevant authorities can be obtained.

The surveyed area has the latitude of 34º22′S and the longitude of 150º45′ with an elevation in the case of Zone 1 ranging from 310-360 metres (1020-1200 feet) and of Zone 2 from 340-460 metres (1122-1520 feet).

ORCHIDS OF AREA 1.



The climate is temperate, humid with occasional frosts in winter; a high summer-autumn rainfall, and a dry spring. Annual rainfall is thought to range from 1500 mm to 1600 mm (Wollongong 1132 mm). The hills are often shrouded in mist and low cloud, especially in winter and early spring. The prevailing winds are N.E. during summer months being a moist sea breeze with frequent southerly changes often bringing heavy rain. The winds in winter are W. to S.W and S.: bring with them cold conditions.

The topography and geology of the area might be broadly described as Hawkesbury sandstone plateau, fissured with erosion gullies, the deeper of which provide protection for rainforest type communities.

The windward slopes, i.e., those facing an easterly direction, often support wet sclerophyll or rainforest type forests.

Area 1

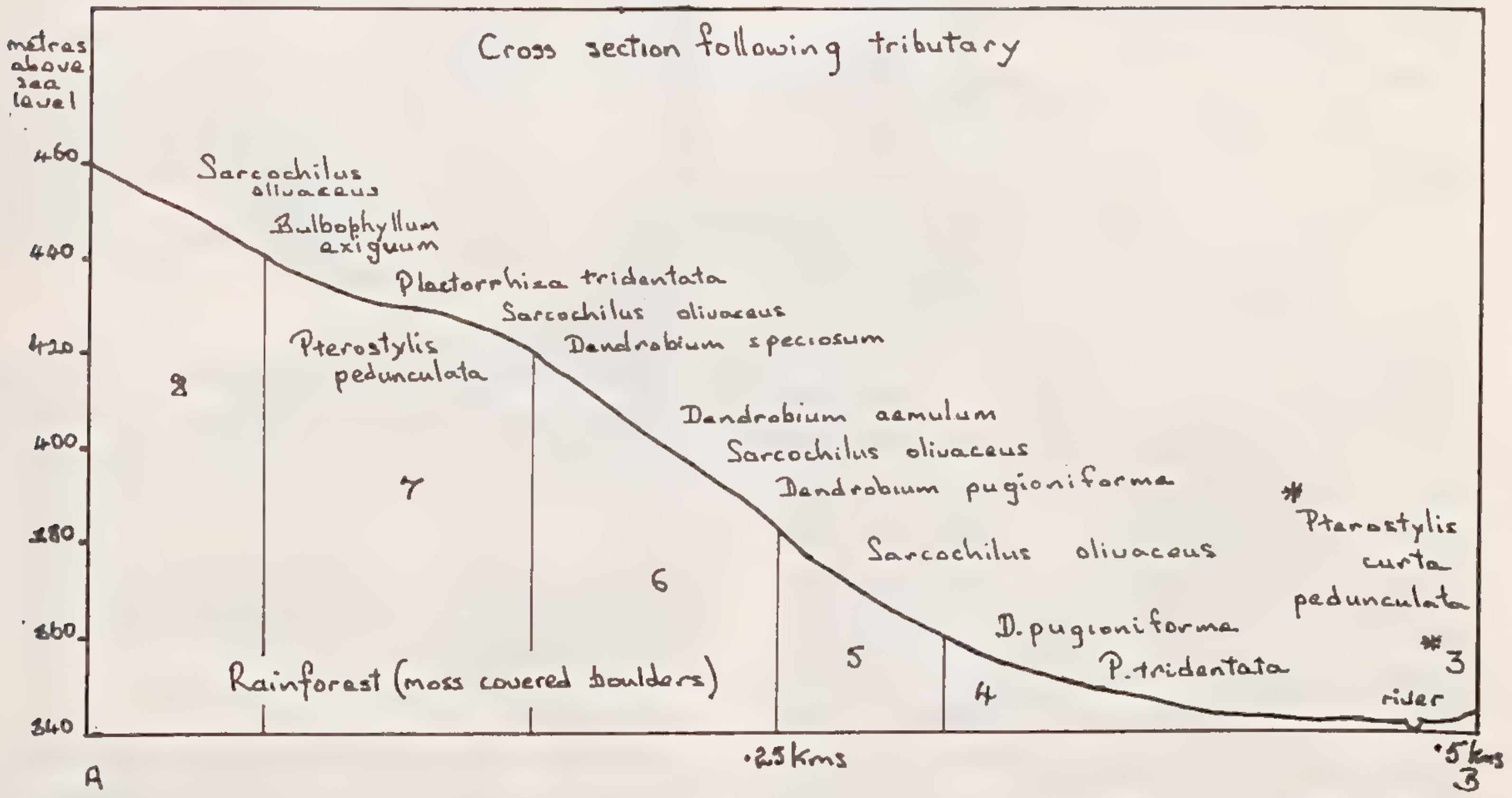
The orchids in this area varied in response to changes in topography and landform. On the upper part of the hill surveyed (zone 3), *Caladenia alba* and *C. catenata* were located. *Caladenia alba* was an especially large attractive pink form and was amongst both *Pterostylis curta* and *Cryptostylis* (unflowering) at the time.

At the base of the hill extending in an E.N.E. direction to the road (zone 1), were the most extensive distributions of orchids in both number and type. This area is a mixture of wet and dry sclerophyll forest which appears to be regularly burnt by the Water Commission. *Pterostylis* species (*P. curta*, *P. pedunculata* and *P. nutans*) were numerous, *Caladenia* less so, while *Chiloglottis* was ever present with thousands of plants but alas only one plant was in flower at the time (*C. reflexa*).

On the other side of the road (zone 2) on the sloping bank of the creek were *Pterostylis nutans* and *P. longifolia*. These were in shade in wet sclerophyll forest which also contained rainforest species (ecotone).

This area was surveyed in late winter to mid spring and as such many more species could be expected to be found in other times of the year. At attempt was made to revisit this area in July 1984, however much of the area was difficult to penetrate due to the regrowth of vegetation due to good rainfall since autumn 1983 (especially zone 1). During 1984 *Spiranthes sinenis* and *Thelymitra* were also found in zone 3.

ORCHIDS OF AREA 2.



Area 2

This area mainly consisted of wet sclerophyll forest with rainforest extending up the creeks which cut into the hillside. The cross section represents one such creek gully which extended in a N.N.W. direction into a fairly steep hill.

At the base of the hill where the creek's southern bank continued onto cleared land (zone 3), terrestrial orchids could be found with *Pterostylis pedunculata* and *curta* being identified. Elsewhere in the adjacent areas were found *Pterostylis nutans* and *longifolia*, *Caladenia alba*, and a very robust form of *Thelymitra* and *Chiloglottis*. The *Thelymitra* were growing along the side of the road and were near flowering but on returning one week later all had been burnt in a control burn. The regular burning would be a factor in *Thelymitra* being so abundant.

The most pleasing aspect of this survey was the location of a considerable number of large *Sarcochilus olivaceus* which extended from about quarter the way up the creek, being both epiphytic and lithophytic. *Dendrobium pugioniforme* was found in the lower and middle sections (zones 4 and 6). One interesting find was a lone *Dendrobium speciosum* which had three mature canes but had never flowered. It was heavily shaded which could account for this. *Dendrobium aemulum* was found half way up (zone 6) high up on the main trunk of a few trees which would receive greater light and morning sun. They were out in full flower in mid August.

Other finds including *Plectorrhiza tridentata*, *Bulbophyllum exiguum* found growing on the mossy bark of a tree (Zone 8): *Pterostylis pedunculata* amongst the mossy rocks and *Bulbophyllum crassulifolium* on rock outcrops above the creek gully in dry sclerophyll forest.

It is also possible that *Sarcochilus falcatus* could be in this area but was not in flower and being small plants, need to be rechecked.

Miscellaneous Notes on the Orchids of North Eastern Queensland

1 — A New Species of Bulbophyllum and Taeniophyllum

by B. Gray and D.L. Jones

***Bulbophyllum boonjee* and *Taeniophyllum confertum* are described as new species, and notes on distinguishing features are given.**

This paper is the first in a series describing new species and giving new records for Australian Orchidaceae. These publications are the result of a long and intensive study of the orchid flora of north-eastern Queensland.

Diagnosis

***Bulbophyllum boonjee* B. Gray et D.L. Jones, species nova affinis *B. lageniforme* Bailey, sed floribus multo parvioribus, saturate brunneo-rubri et labello tuberculato differt.**

Planta epiphytica, in gregibus parvis crescens. Rhizomata breviter repentia. Pseudobulbi congregati, globulares ad depresse globosi vel conici, pallide virides, 5-8 mm x 4-5 mm. Folium ± erectum, 20-42 mm x 4 mm, lineari-lanceolatum, ± petiolatum, pallide viride. Inflorescentia 15-30 mm long, floribus 2-4. Pedunculus filiformis, bracteis 2-3 parvis expansis. Pedicellus cum ovario 3-4 mm in longitudinem; ovarium leve. Flores 4-5 mm x 6-7 mm, saturate brunneo-rubri, a nervis tribus propriis in sepalis praediti. Sepalum dorsale 3-4 mm x 1-2 mm, cucullatum, ovatum, acutum. Sepala lateralia 3-4 mm x 2.5-3.5 mm, late triangularia, expansa. Petala 2-3 mm x 1-2 mm, ovata, acuta, incurva et columnam includentia. Labellum 2.5 mm x 0.8 mm, curvatum, crassum, obtusum, oblongum ad linguiforme, omnino saturate brunneo-rubrum, in superficie tubercalatum. Discus paulo jugulatus. Columna 1-1.5 mm long; columnae pes ± 2 mm longus, omnino curvatus; stelidia brevia, integra, apiculata. Antherae cucullus ± 0.5 mm x 0.6 mm, rostro perbrevi truncata et jugo dorsali prominenti.

TYPUS: Cook District: State Forest Reserve 310, Parish of Gadgarra, Swipers Logging Area, 17° 22's, 145°44'E, B. Gray 1005A, 14 Sept. 1978 (holotypus QRS).

Epiphytic orchid growing in small clumps. Rhizomes short-creeping. Pseudobulbs crowded, globular to depressed globular or conical, pale green, 5-8 mm long x 4-5 mm wide. Leaf ± erect, 20-42 mm long x 4 mm wide, linear-lanceolate, ± petiolate, pale green. Inflorescence 15-30 mm long, 2-4 flowered. Peduncle filiform, with 2-3 small, spreading bracts. Pedicel plus ovary 3-4 mm long. Ovary smooth. Flowers 4-5 mm long x 6-7 mm wide, dark maroon, with 3 distinctive nerves on the sepals. Dorsal sepal 3-4 mm long x 1-2 mm wide, cucullate, ovate, acute. Lateral sepals 3-4 mm long x 2.5-3.5mm wide, broadly triangular, spreading. Petals 2-3 mm long x 1-2 mm wide, ovate acute, curved inwards and enclosing the column. Labellum 2.5 mm long x 0.8 mm wide, curved, thick, blunt, oblong to linguiform, maroon throughout, tuberculate on the proximal upper surface. Disc slightly ridged. Column 1-1.5 mm long. Column foot about 2 mm long, curved throughout. Stelidia short, entire, pointed. Anther cap ± 0.5 mm long x 0.6 mm wide, with a very short, truncate rostrum and a prominent dorsal ridge.

Distribution and Ecology

Bulbophyllum boonjee appears to be a rare species and is at present known only from the type locality in the Boonjee area on the eastern side of the Atherton Tableland at an elevation of 720 m. It occurs in small, discrete clumps each consisting of a few pseudobulbs and grows on the upper branches of trees in dense rainforest. Flowering occurs from September to February.

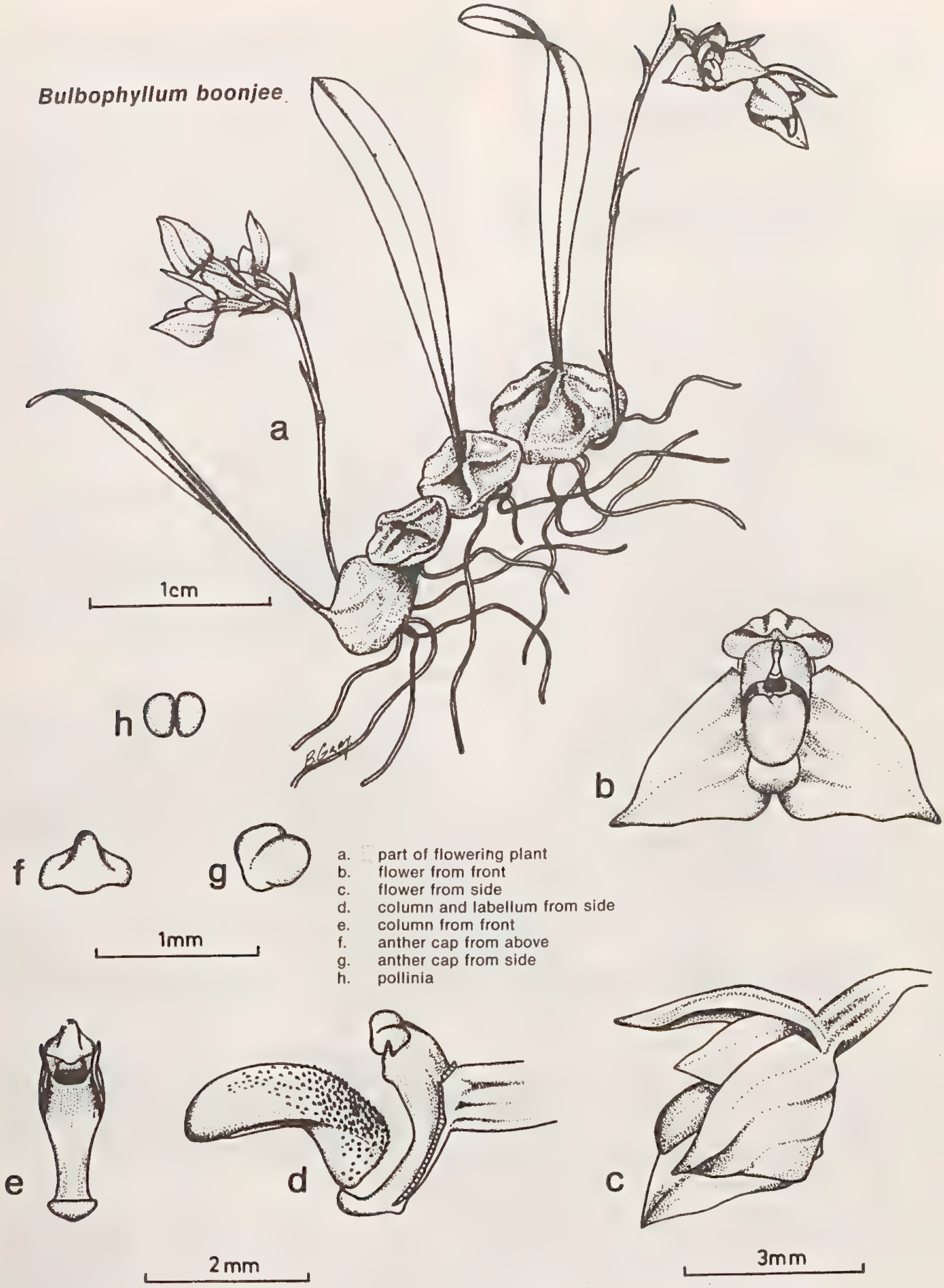
Discussion

Bulbophyllum boonjee belongs to the section Macrouris and is related to *B. lageniforme* Bailey and *B. newportii* (Bailey) Rolfe. It is closest to *B. lageniforme* Bailey. It differs from this species in its overall smaller habit, the much smaller, deep maroon flowers and the distinctly tuberculate labellum. The differences are detailed in the accompanying table.

Comparison Table

B. boonjee	*B. lageniforme*
Flowers 4-5 mm long dark maroon	Flowers 7-8 mm long, pale green, cream or rarely pink
Labellum 2.5 mm long x 0.8 mm wide, tuberculate on the upper surface, the disc with a single ridge.	Labellum 6 mm long x 3.5 mm wide, smooth on the upper surface the disc with two pairs of keels.
Column 1-1.5 mm long, the column foot 2 mm long.	Column 2.5-3 mm long, the column foot 4-5 mm long.

Bulbophyllum boonjee



a. part of flowering plant
b. flower from front
c. flower from side
d. column and labellum from side
e. column from front
f. anther cap from above
g. anther cap from side
h. pollinia

B. newportii has a papillose labellum but can be readily distinguished from the above two species by its long-creeping rhizome and widely separated pseudobulbs.

It is worth noting that the pollinia of *B. boonjee* are very tightly aggregated and it is difficult to discern the suture between them.

***Taeniophyllum confertum* B. Gray et D.L. Jones, species nova, pedunculus abbreviatus (2.4 mm longus), a bracteis 6-12 vaginantibus imbricatus omnino obtectus.**

Planta epiphytica efoliata, in gregibus parvis crescens. Radices 2-3 mm latae, ad 15 cm longae, caesio-virides. Inflorescentia abbreviate spicata. Pedunculus 2-4 mm longus, a bracteis 6-12 vaginantibus omnino obtectus. Bracteae imbricatae, virides, 1.5-2.0 mm longae, late triangulares, eorum apicibus expansis acuminatis. Flores intra bracteas portati, passim et singulatim aperientes (in inflorescentia una alabastros, florem et capsulas invenire potest), 4-5 mm longi, tubulati, pallide virides. Sepala et petala similia, eorum pro ultra dimidium connata, apicibus paulo expansis, carnosa, plus minusve anguste triangularia, petalis paulo brevioribus. Labellum 3 mm x 1 mm, integrum vel obscure lobatum, omnino carnosum, viride, cymbiforme, apici incurvato, appendicula brevi obtusa; labelli sacculus 1.5-2.0 mm longus, globosus vel subglobosus. Columna ± 0.75 mm longa, recta sed projecta; alae vestigiales. Stigma immersum. Rostellum obtusum, moderate prominens. Antherae cucullus ± 0.3 mm x 0.5 mm, a gibbis duobus prominentibus praeditus; rostrum moderate prominens, decurvatum. Pollinarium ± 0.25 mm longum; pollinia ovoidea, flava, in paribus duobus inaequalibus disposita; stipites ± 0.25 mm longi, curvati; Capsula 12-15 mm x 3-4 mm, falcato-oblonga, in sectione triangularis, ad radices appressa.

Typus: Cook District: Timber Reserve 146, Mondhouse Tableland Logging Area, 15°43′S, 145°16′E, B. Gray 1797, 11 Sept 1980 (holotypus QRS).

Leafless epiphytic orchid growing in small clumps. Roots 2-3 mm across, dull green, up to 15 cm long. Inflorescence an abbreviated spike. Peduncle 2-4 mm long, completely covered by 6-12 sheathing bracts. Bracts imbricate, green, 1.5-2 mm long, broadly triangular, with spreading acuminate tips. Flowers borne within the bracts, opening sporadically one at a time so that buds, a flower and capsule(s) may be present on an inflorescence. Flowers 4-5 mm long, tubular, pale green. Sepals and petals similar, connate for more than half their length, the apices slightly spreading, fleshy, narrowly triangular, the petals slightly shorter. Labellum ± 3 mm long x 1 mm wide, entire or obscurely lobed, fleshy throughout, green, cymbiform, the apex incurved, with a short, blunt appendage. Labellum sac (spur) 1.5-2 mm long, globose to subglobose. Column ± 0.75 mm long, straight, projecting forward. Column wings vestigial. Stigma sunken. Rostellum blunt, fairly prominent. Anther cap ± 0.3 mm long x 0.5 mm wide with 2 prominent humps, the rostrum fairly prominent and decurved. Pollinarium 0.25 mm long. Pollinia 4, in 2 unequal sized pairs, ovoid, yellow. Stipes ± 0.25 mm long, curved. Capsule 12-15 mm long x 3-4 mm diameter, oblong, falcate, triangular in cross section, appressed against the roots.

Distribution and Ecology

So far known only from a few localities between the Endeavour and Mulgrave Rivers in North Queensland, viz. Big Tableland, Mt. Lewis, Lamb Range and Mulgrave River mostly at elevations between 400 and 600 m. It occurs in rainforest where it grows on twigs and branches of trees, flowering sporadically but mainly between August and December.

Discussion

This species is rarely collected, probably because of its small stature and leafless state. Although it has been found in company with *T. glandulosum* Blume, *T. confertum* has no close affinities with any other Australian species of *Taeniophyllum*, and can be easily distinguished by the abbreviated peduncle bearing 6-12 conspicuous imbricate sheathing bracts.

Other Specimens

Queensland: Cook District: State Forest Reserve 607, Bridle Logging Area. B. Gray 2171 24-9-81 (QRS); P. Vaughan, Goldsborough (photograph).

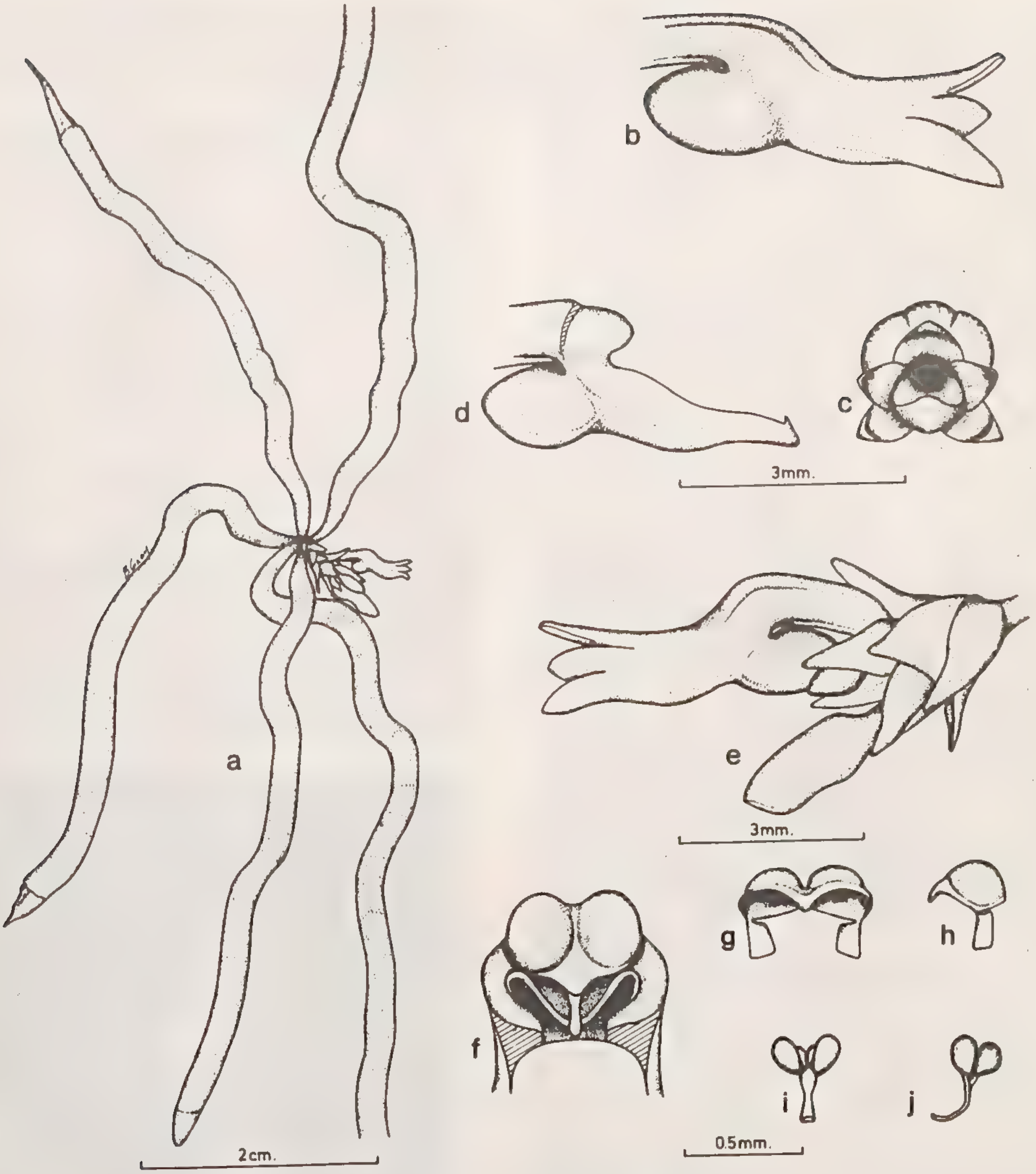
Acknowledgements

The authors express appreciation to Dr Jim Willis for the Latin diagnoses, Peter Vaughan for supplying a slide of *T. confertum* and Barbara Jones for typing the manuscript.

P.O. Box 261
Palm Beach
Qld. 4221

11 October, 1984

Taeniophyllum confertum



Taeniophyllum confertum
a. flowering plant
b. flower from side
c. flower from front
d. labellum and column from side
e. flowering inflorescence
f. column from front
g. anther cap from front
h. anther cap from side
i. pollinarium from front
j. pollinarium from side

Drawings by B. Gray.

Observations on the Pollination of Leporella fimbriata (Lindl.) A.S. George

by Rod Peakall

Abstract: Observations on the pollination of *Leporella fimbriata* were conducted in the Darling Range, east of Perth. Leporella is pollinated by winged male ants (*Myrmecia* sp.) which are attracted by pheromone like substances emitted from the glandular petal tips, form and coloration of the labellum is a probable visual mimic of the queen ant.

Pollination was observed while investigating a large colony of *Leporella fimbriata* on the warm, cloudless 20ºc afternoon of May 3, 1984. A small flying ant with yellow pollinia on its thorax was seen flying several centimeters above the ground, but below the height of the flowers. Flight was momentarily interrupted by a brief visit to plant no. 1 before alighting on the stem of plant no. 2. The insect immediately crawled up the stem, past the first flower and aligned itself along the width of the labellum of the second flower. It then curled its abdomen into a copulatory position, making probing movements along the side edge of the labellum. In this position, the thorax with attached pollinia was directly below the stigma. At this stage the insect was captured as a specimen for identification. This particular flower had been examined previously and found to be freshly pollinated; the observed visit therefore being at least the second visit of a pollinator to that flower.

A second ant was found on another flower in a position similar to that described above. Pollinia on the ant's thorax was in direct contact with the sticky stigma. The ant remained in this position for approximately 3 minutes making frequent probing copulatory movements of its curled abdomen inside the unfringed side edge of the labellum. Departure of the insect from the labellum was preceded by a slight twist which enhanced contact of the thorax with the pollinia in the anther. This procedure resulted in the removal of pollinia lobes from one side of the anther. The ant then moved to the back of the flower and remained on the upright sepal and petals for 2 or 3 minutes before departing the plant (plant no. 3).

The next 10 minutes the insect rested on nearby vegetation; little activity was observed before it flew to the ground and was momentarily lost. The ant was eventually re-located on the ground before it flew to bait flowers previously picked and placed in a vial. The insect circled the bait flowers at radii of 30 to 40 centimeters several times, then zig-zagged upwind and alighted on one of the bait flower stems (plant no. 4). The same behaviour as previously described was observed with the ant staying on the labellum for about 4 minutes. Again, it exhibited the same twisting movement from the labellum, removing pollinia lobes from one side of the anther. Some time was again spent on the upright sepal and petals before the ant was captured as a second specimen. Examination of the previously unpollinated bait flower revealed pollen on the stigma.

A short time later a second ant was found on the same flower of plant no. 3 in which pollination has been described. After pollination the ant remained on the petals and dorsal sepal for over 10 minutes before flying some 3 metres to the main concentration of Leporella flowers. The ant crawled and flew amongst the colony of flowers before circling plant no. 5. The zig-zagging upwind flight pattern was observed followed by a particularly vigorous pollination event in which the labellum was moved laterally from side to side. This event only lasted for 3 minutes before the ant moved from the labellum to the back of the flower for a further 3 or 4 minutes. Pollination was observed at this same flower a second time, however, pollination was again a relatively passive event.

Male *Myrmecia* sp. pollinating *Leporella fimbriata*
Photographed by Rod Peakall.

Leporella flowers have no detectable odour, however, the circling then upwind zig-zag flight pattern to the flower suggest a chemical gradient most probably a pheromone or pheromone-like attractant. Grandular petal tips removed from plant no. 5 and pinned to a nearby branch attracted a male ant within 15 minutes. The ant bearing pollinia on its thorax from previous pollination experiences remained on the petal tips for about 8 minutes during which time little activity was observed.

Active pollination was still occurring just before sunset on plant no. 6 despite the shading of the colony and the lowering of the temperature.

The author wishes to especially thank Dr W. Bailey and Dr J. Majer for assistance with identification of the pollinator, A. Brown for valuable information on plant locations and Dr S. James and Miss J. Cohen for assistance with the manuscript.

These observations form part of the honours research project 'Preliminary Investigations into the Genetic Systems of Western Australian Orchids' currently being undertaken by the author. A more detailed scientific paper on the pollination biology of *Leporella fimbriata* is in preparation.

Rod Peakall
Department of Botany
University of W.A.
Nedlands W.A. 6009

9th July, 1984

Gastrodia sesamoides R.Br.

by Lex Barton

In Australia the genus Gastrodia is represented by two species, *Gastrodia queenslandica* Dockr. from northern Queensland and the more widespread *G. sesamoides* with a distribution ranging through all states from south eastern Queensland to the south west of Western Australia. Both species are saprophytic.

Under ideal conditions *G. sesamoides* forms into colonies. Within these colonies considerable variation in plant size occurs with the smaller plants carrying only a few spindly little flowers whilst others grow to an excess of 700mm tall with many large flowers. Initially flowers are erect but become pendulous as they develop. When in the latter position the labellum is above the column, the anther is intact and below the stigma so that there is little chance of self pollination.

On a trip to the Barrington Tops (NSW) in January, 1982 it was noted that there was a high proportion of pollinated flowers. By contrast a visit to the same region in January, 1984 showed very few plants had set fruit.

No insect pollinator was observed but a Robber Fly (*Ommatius sp.*) was seen maintaining a patient vigil on one plant.

When dissected, one of the most noticeable features of the tubular shaped flowers was the petals. The vestigial petals have become fused to the sepals for all but the last 3 to 5 mm. The labellum margin was undulate with the vasal section forming a distinct lyre shape, the inside of which was heavily coated with what appeared to be pollen. When the anther was removed the pollinia were observed intact in all flowers inspected.

When viewed through a magnifying glass it was further noted that there was a point beyond which no 'pollen' was seen to adhere to the labellum. Other flowers from the same plant were also viewed and the 'pollen' adhered to the labellum as previously described.

Could it be that *G. sesamoides* has produced a pseudo-pollen to attract pollen eating insects for the purpose of pollination?

Since moving to Queensland I have not been able to locate any plants of *G. sesamoides* and would like to contact anyone who has observed it in Queensland.

Similarly I would like to contact anyone who has knowledge of *Epipogium roseum* in south east Queensland.

34 Duncan Street
Riverview 4305 Qld.

Footnote:

"Orchid pollen is not used for food by flower-visiting insects, but a number of orchids offer pseudopollen, or a mealy, pollenlike foodstuff. We find such mealy food on the lips of most *Polystachya* species and some species of *Maxillaria* and *Eria*. This pseudopollen is gathered and used as food by insects, usually bees."
— From R.L. Dressler: The Orchids. Natural History and Classification. Harvard University Press, 1981.

8th September, 1984 **David McAlpine**

Australian Deciduous Terrestrial Orchids — Cultural Notes

by L.T. & M.K. Nesbitt

These terrestrial orchids are adapted to a mediterranean climate such as occurs in the Southern States of Australia and in these areas are easy to grow. In Adelaide they thrive in a shadehouse of 50% shadecloth. NSW and Qld growers may need to provide some overhead protection from rain in warm weather. Vic growers often provide overhead protection from winter rain and water by hand. In very cold areas an unheated glasshouse may be required for frost protection, although light frosts do not worry the majority of species. Australian ground orchids normally follow an annual growth cycle comprising 6-8 months as growing plants under cool (5-15°C) moist conditions and 4-6 months as dormant tubers in hot (15-40°C) dry conditions. All species like good air circulation and will not thrive in a stuffy humid atmosphere especially if temperatures are high. Some species prefer heavy shade, others full sunlight, but most will adapt to a wide range of light intensity. If the leaves and stems are weak and limp or if the leaf rosettes are drawn up to the light then shading is too dense and the amount of light should be increased. The spring flowering species can take higher light intensities at flowering time and flowers may not open properly under dull conditions.

Keep the soil moist at all times during active growth by watering gently if there is no rain. Handwatering is especially necessary in spring as soil in pots dries out more rapidly than that in the garden. Watering must be done slowly so that the mat of needles on the surface of the pot is not disturbed. Slugs and snails love these plants and must be kept under control. Keeping the pots up off the ground on galvanised steel benching is very effective in controlling these pests.

Be very careful with fertilisers because some terrestrial orchids are easily burnt or even killed by overuse. *Pterostylis, Chiloglottis,* and *Diuris* are very hardy and will benefit from weak applications of foliar feed in the early growth stages. Do not use fertilisers or insecticides on the more difficult to grow *Caladenia* and *Thelymitra* species. These species depend on a delicate association with certain fungi in the soil, an association which is easily upset by chemical treatments.

The new tubers are produced in winter — spring. Most of the species on this list are colony types, that is they multiply each year by forming several tubers per plant. Some time in spring the green leaves go yellow and then brown and dry as the days get hotter and drier in late spring. After the leaves have turned brown, let the pot dry out completely to dry up old roots and tubers otherwise they will turn into a soggy mouldy mess and infect the adjacent new tubers.

The pots can be knocked out and the tubers examined in summer without harm. In fact we find at the nursery that the best results are obtained if the tubers are repotted in fresh soil each year. Our soil mix is 40% loam, 45% sand, and 15% peatmoss with a little blood and bone fertiliser added. In other states a coarser mix with hardwood chips or leaf-litter in place of the peatmoss may give better results. Replant the dormant tubers with the tops 20mm deep. Cover the soil surface with a mulch of pine needles chopped to 20-50 mm long, to prevent erosion. Repotting is normally done in November, December and January.

Keep the pots shaded and almost dry until the end of February when they may be set out in their growing positions and watered lightly. The tubers of some species will rot if kept wet during the dormant period, others will produce plants prematurely which are then attacked by pests such as thrip and red spider and fungal diseases in the warm weather.

Each tuber sends up a shoot to the surface in autumn and leaves grow rapidly in late autumn — early winter as the rains set in. *Pterostylis* is usually the first to appear in March, followed by *Diuris* in April, *Caladenia* in May and *Corybas* in June-July.

Good air circulation over the pot is essential to prevent mould and leaf rot. Sun loving species (*Thelymitra, Diuris, Microtis*) prefer a brighter location for good growth. *Corybas* like the shadiest corner.

Australian deciduous terrestrial orchids are delightful plants to cultivate. Because they are small plants they look better if several plants of the same type are grown together in a pot. They are usually exhibited in shows as massed displays in 200-300 mm pots. They fit in well with evergreen plants in a shadehouse during Autumn — winter — spring but must be allowed to dry out in summer. The pots can be grouped in one corner and hardly watered at all, or can be taken out of the shadehouse and stacked against the south wall of the house where they can remain shaded and cool until they are returned to the shadehouse at the end of February. Australian terrestrials are the best orchids to have in times of drought since their water requirements are so small.

18 Cambridge St
Vale Park
S. Australia 5081

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Bulbophyllum minutissimum

Drawing by M. Penberthy

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Articles should be typed in duplicate preferably on A4 size paper; double spaced with 4cm or more left hand margin.

Consolidated Index Vols. 1 - 5

The Council is desirous that this project be completed as soon as possible, now that the typesetting and proof-reading is complete. It has been decided, reluctantly, that some of the money from the Colour Fund, until now untouched, be used to print this valuable work. All of the money from the sale of the index will be returned to the Colour Fund immediately on receipt.

We are offering the index at a pre-publication price of $5.00. This price will be increased for any orders received after publication.

[Index to Vol. 7.]

We would like to inform our readers that a General Index to Vol. 7 is in preparation and will be included as an insert in the June issue.

Obituary

Herbert (Bert) James Rumley Overall.
15th August 1889 — 30th September, 1984.

We note the passing of Bert Overall, the originator of Dendrobium Bardo Rose, registered in 1961.

As a member of the Tasmanian Field Naturalists Club, he took an active and lifetime interest in all Australian flora, with a particular interest in native orchids.

It is interesting to note that the first photograph published in the Australian Orchid Review was one of *Sarcochilus hartmannii* photographed by him in 1936 and he was a frequent contributor to that magazine, sharing his vast knowledge and interest of orchids with its readers.

A.N.O.S. — Sydney Group
Third Annual Autumn Show

A.N.O.S. Sydney Group advises that its Third Annual Autumn Show will be conducted on Sunday 28th April, 1985 at the Ryde School of Horticulture, 59 Parkes Street, West Ryde.

As in previous years this will be a one day show, designed to display our Autumn flowering species and hybrids as well as to allow members of the Regional A.N.O.S. Groups a chance to socialise.

Benching will be from 7.30 a.m. to 9.30 a.m. and judging 9.30 a.m. to 11 a.m. The show will be opened to the General Public from 11.30 a.m. to 4.30 p.m.

Mr. Murray Corrigan, the A.N.O.S. Registrar of Judges, advises that prospective A.N.O.S. Trainee Judges should attend and be present at completion of judging (11 a.m.) as the Judging Panel will be selecting potential candidates at this time.

Brex Butler
Show Secretary.

Increase in Fees

It is with regret that Council has to increase fees to $14.00 p.a. This is due to the ever increasing rise in the cost of postage etc.

[Corrigenda.]

p. 7 tawleri should read lawlerii
p. 23 montii should read mortii
p. 37 fimbriatia should read fimbriata

HABITATS AND CULTIVATION XI BULBOPHYLLUM MINUTISSIMUM

by M. Harrison

Although *Bulbophyllum minutissimum* is often said to be the smallest orchid in the world, it cannot really claim this distinction. Its closely related cousin, B. globuliforme is relatively much smaller, with pseudobulbs averaging about half the size of those on *B. minutissimum.* When not in flower, *B. globuliforme* and *B. minutissimum* appear quite similar, but upon close examination several vegetative differences are apparent. (*See colour pages.*) The shape of the pseudobulbs distinguishes the two, with *B. globuliforme* producing rounded, green pseudobulbs about 2 mm. tall, while those on *B. minutissimum* may measure up to 5 mm. across, and are flattened, almost as if they have been dropped from a height and have collapsed upon impact. I know it sounds unflattering, and I really shouldn't say so, but they do remind me so of miniature cow pats. They are also usually tinged with red, and may darken to almost a claret colour in situations where the plant is exposed to strong light. In both species, each pseudobulb carries a small, pointed green leaf, which is usually shed by the third year, leaving a small scar on the apex of the pseudobulb.

However, when one is able to see each species in flower, they are quite obviously different. *B. minutissimum* produces its flowers singly, close to the pseudobulbs, on short peduncles of less than 5 mm. tall. The flowers are more or less red (actually red striped) and may last up to a week before they begin to fade. On the other hand, the flowers on *B. globuliforme* are borne on tall peduncles, up to 15 mm. in height, are white or light cream, and measure approximately 5 mm. across, making them slightly larger than those of *B. minutissimum.* They, also, are borne singly. An unusual characteristic of the flowers of *B. globuliforme* is that they usually twist or rotate on the peduncle to a certain extent, with some individuals turning through 180° into a more or less upside-down position. Both species tend to form themselves into densely packed masses with age, although having seen some very extensive colonies of *B. minutissimum,* I cannot imagine that *B. globuliforme* grows to quite the same proportions. Late spring is generally the flowering season for both of these orchids.

B. globuliforme is a rare orchid, very restricted in distribution. It has only been recorded from the upland sub-tropical rainforests of the N.S.W./Queensland border ranges, and it apparently grows almost exclusively on the Hoop Pine (*Araucaria cunninghamii*), colonising the upper branches in much the same way as *B. weinthalii* does. I imagine they even grow together at times, on the damp, moss-covered branches, sustained by the rising humidity, heavy dews and regular year-round rainfall. Surely, the only time *B. globuliforme* is likely to be encountered is when a tree has fallen or been cut for timber, for its size would make it invisible from the ground. I suppose that some intrepid orchid hunters may actually climb Hoop Pines in their never-ending quest for orchidological fulfilment, but my concept of hell would have to be forty or fifty metres up a Hoop Pine during an even moderate breeze. I may be keen but I'm not crazy. The late Lloyd Bradford was able to salvage some specimens of *B. globuliforme* from logging operations some years ago in the Wiangarie State Forest (now part of the Border Ranges National Park), and several of these still survive in cultivation in Sydney. I have searched for this orchid myself on several occasions but I have not yet been lucky enough to find it in the wild. I was able to acquire one of the specimens in Lloyd's collection when it was sold last year, and to date it has grown very well on a piece of weathered hardwood. Since re-establishing the plant on this host, from its original small slab of smooth natural cork (too smooth for my liking), I have watered it nearly every day. It is positioned in a well-lighted spot in my unheated fibreglass house, situated alongside *B. macphersonii, B. bowkettae, Dendrobium torresae,* etc., other orchids requiring similar cool, well-ventilated conditions.

In my experience, *B. minutissimum* is as much at home in dense rainforest, as it is on rocks in exposed positions. It seems fairly cosmopolitan in its requirements, and I have seen it on trees in lowland coastal rainforest, further inland on trees in typical sub-tropical rainforest, as well as on rocks close to the ocean. Recently, I discovered a population of *B. minutissimum* situated well inland, about 150 km. from the coast, where it grows both on giant figs and on cliff faces, in a sheltered, rocky gorge. I am also reliably informed that there is a colony of *B. minutissimum* growing on a Moreton Bay Fig (*Ficus macrophylla*) in one of the main streets of a large coastal town in N.S.W., and that in another area, another Moreton Bay Fig supports a colony of this orchid right beside a major highway. Exact locations have been purposely withheld, but I'll bet a great many figs will be scrutinised over the next few months.

B. minutissimum has a relatively wide distribution, extending from the N.S.W. south coast, northwards into southern Queensland. Peter Hind of The Royal Botanic Gardens, Sydney, recently found a colony near Rockhampton, in central eastern Queensland, and this find extends the recorded northern limit of this orchid by several hundred kilometres. As an epiphyte, *B minutissimum* has a definite affinity for fig trees, in particular, the Moreton Bay Fig, although it certainly also grows on other types of trees in rainforest situations, especially smooth-barked tree species. It has also been recorded as growing on the rough-barked Hoop Pine on a few occasions. Where it grows as a lithophyte, it appears to occur mainly on sandstone, generally thriving amongst mosses and encrusting lichens, often in quite bright situations. It is in these situations, especially, when the pseudobulbs develop an overall dark red coloration, no doubt in response to the high levels of light. "Exposed positions" does not really adequately describe the lithophytic habitat of *B. minutissimum,* for although it does commonly occur in well-lighted positions, such situations, when analysed, usually afford the orchid considerable protection, at least from drying westerly winds. Even in areas with a westerly aspect, the orchid is generally found on a section facing away from the west, under an overhanging rock or protected by a cleft.

As the Moreton Bay Fig does not occur naturally in the Sydney area, it would be interesting to know if *B. minutissimum* has ever been found on the Port Jackson or Rusty Fig (*F. rubiginosa*). *B. minutissimum* was first discovered in 1849, in "the gully leading down from Woollarah to Rushcutter's Bay", now inner city suburbs of Sydney. That original specimen was growing as a lithophyte, on sandstone, amongst mosses, close to a small waterfall, an interesting recording, for I have only seen or heard of it on rocks in far northern N.S.W. and southern Queensland. South of Sydney, where the Moreton Bay Fig reappears after avoiding the predominantly sandstone country of the Sydney Basin, *B. minutissimum* again colonises this tree, and has been reported up to at least 200 km. south of Sydney.

On each occasion I have seen this orchid, whether growing on rocks or trees, I have been impressed with the extent to which it develops into large masses. It often grows right around a large branch or rock face, and sometimes grows so thickly that the underlying host cannot be seen. The masses of small bulbs and interconnecting rhizomes become completely entangled as they grow over and under each other, so that eventually a thick mat may consist of many layers of old bulbs, built up, strata upon strata, over the years. Conversely, a plant may develop laterally, and extend itself, one bulb at a time, along a tree limb or a rock. Every now and then the rhizome branches, and a new lead heads off in a different direction, and a fine, sparse, beaded effect is created over the surface of the host. With this style of development, a plant may cover quite a large area, up to several square metres, with these miniature, irregular chains creating intricate and fascinating patterns, at random. In rainforest, *B. minutissimum* tends to colonise the main trunk of host trees, whereas when it occurs on large figs in more open situations, it grows mainly on the major laterals. It also commonly occurs quite low down on host trees, affording the observer an excellent close-up look.

Although many growers say they have never seen this orchid in the bush, I believe it is probably more common than generally thought. Its small size and unremarkable coloration make it very inconspicuous, and many enthusiasts have probably come closer to seeing it than they think. I remember finding one colony by feel, not by sight. As I leant forward to look at a plant of *D. speciosum* growing halfway down a cliff face, I braced myself by placing my hand on the branch of a large fig growing nearby. The rough, warty feeling beneath my hand, where I had expected smooth bark, soon alerted me to the presence of this orchid. At times, I imagine colonies of *B. minutissimum* have been mistaken for mosses, for at even short distances, its appearance can be deceptive. It often grows in association with mosses, making its presence very difficult to detect.

Contrary to popular opinion, *B. minutissimum* grows well in cultivation. This may seem like a sweeping and definitive statement, but in my experience it would have to be one of the easiest of all our *Bulbophyllum* species. For ease of cultivation, I would place it on a par with *B. crassulifolium* and *B. johnsonii,* two other species which grow and flower, year after year, with no apparent physical or psychological problems. I grow my plants mainly on old weathered hardwood floorboards, sawn into lengths of about 15 cm. The very fine, short roots, which seldom extend any longer than about 8 mm., find their way into the fine cracks and fissures of the weathered surface and hold the orchid firmly in position. I treat these plants in a similar style to that described earlier for *B. globuliforme;* that is, cool, humid, airy conditions with reasonable levels of light, in this case under fibreglass with an inherant shade factor of about 50%. I water the plants most days during the summer and every third or fourth day during cooler weather. I have noticed that after some time, the hardwood develops on its surface a fine layer of what appears to be algae, which gives the wood a greenish tinge. This is not slimy to touch but quite dry, and appears to have no detrimental effect on the orchid. In fact, I find it quite attractive.

By far the most difficult members of the genus *Bulbophyllum* are the thin-leaved, conical pseudobulbous species, such as *B. exiguum, B. newportii, B. lageniforme, B. lilianae* and *B. tuberculatum* - members of the Section Macrouris, according to Dockrill's "Australian Indigenous Orchids", and listed above in my order of increasing difficulty. The one Australian member of this section which, for some reason, does not fall into the "hard-to-grow" category is *B. bracteatum,* usually an easy subject in cultivation. There are two other *Bulbophyllum* species I consider difficult, *B. elisae* and *B. evasum,* but these have proven to be almost impossible for me, and nowadays I'm not talking to them anymore. I know some of you out there will be saying that *B. exiguum* and *B. newportii* are easy to grow, but I do have problems with the orchids in this section. Premature leaf drop is the problem, and although *B. exiguum* and *B. newportii* are less prone to this condition than the others, they still suffer it from time to time. After observing this problem closely over the last twelve months, I have come to believe that it is due entirely to environmental conditions and not to any underlying fungus attack or lack of nutrition. Because of the very thin, almost membranous nature of the leaves of these species, they are very prone to scorching and dehydration, due to excessive light, heat or low humidity. These three factors, especially when acting in combination, can be quite devastating, and these species are most at risk. The provision of fresh, moving air is the best way to avoid this problem, combined with a cool, humid atmosphere, and although the remedy is not 100% effective, and leaves may continue to dehydrate and drop, it will go a long way in reducing losses. The process typically commences at the leaf tip and progresses until the entire leaf browns and drops. Sometimes only the tip is affected and the leaf is able to function normally, but, more often than not, the whole leaf is lost. Eventually, this process may debilitate a plant to the extent where it can no longer feed itself and, having exhausted its stored reserves on attempting to produce new growths, will completely die. Even it it is successful in producing a new batch of pseudobulbs, these new growths are generally not very robust and will usually succumb quickly if conditions are not to their liking. Like many other orchids, *Bulbophyllum* species are very difficult to save once they lose vigour. With regard to *Bulbophyllum* species, in particular, I cannot stress too strongly the importance of fresh, moving air in creating the so-called "bouyant" atmosphere, which is so necessary for their long-term health in cultivation. Under natural conditions, these orchids grow in a variety of habitats, but generally in situations where there is a continuous gentle stream of cool, moisture-laden air. In the early morning they are wet with dew or mist, and, as the day wears on, cool, humid air from the valleys is drawn up the hill-sides. This fresh, moving air passes up through the branches which support these epiphytes and carries off any excess moisture as vapour. By mid-morning the exposed surfaces of the orchids are quite dry. The roots, however, buried deep within the mosses and ferns, never dry out.

For many years I used treefern fibre for just about all slab-mounted orchids and achieved good results. During the cork revolution of the mid-1970s, everyone, it seems, switched to this "new" medium, and the merits of cork were heralded up and down the land. Treefern fibre appeared doomed to redundancy. During this time I virtually abandoned treefern fibre, and just about every new orchid was mounted on cork. Early on I used only compressed cork but later I used natural cork as well. Between 1976 and 1982 I used this medium extensively, basically with good results. Initial root growth during re-establishment, especially, was excellent, and in comparison with treefern was appreciably better. Treefern fibre has a tendancy to retard new root growth. The growing tips may burn upon contact with the fibre, and even when this does not occur, the roots often progress slowly, as if they are not totally happy.

Although I overlooked or ignored it initially, I became aware of a problem with cork just a couple of years ago. I came to realise that many orchids were not performing as well as they should. They seemed sluggish and dull, as if they lacked vitality, and when I analysed the situation, I found it was the cork-mounted plants which showed these signs. This realisation shocked me somewhat but I was in for an even bigger surprise. Taking stock of the situation, I consciously set out to evaluate the long-term results of my cultural techniques. I looked at the label of every slab-mounted orchid, noting the date of mounting and the medium used. As I went on, it dawned on me that my older orchids, those original pre-1976 plants on treefern fibre, were in excellent condition. A few dated back to as early as 1965, with a considerable number from around the 1968 - 1970 period, and included several different genera, most notably *Dendrobium* and *Bulbophyllum*. *Sarcanthinae* species were, however, virtually absent, with only a couple of *Sarcochilus olivaceus* and one sickly *S. falcatus*. I took this to mean that treefern fibre is unsuitable for *Sarcanthinae*, although I have had recent successes with some species on lengths of open, strandy treefern, especially in thin sawn pieces.

I now believe that cork is not the wonder medium it is popularly thought to be. It seems to me that cork is lacking something and that over a long period this factor causes a loss of vitality in the orchid's growth. I doubt that there is something in cork which actually retards long-term orchid growth; rather, I suspect it is probably a shortage of one or more trace elements, perhaps associated with the lack of natural breakdown of cork, a factor generally considered to be one of the advantages of cork. Optimum feeding may indeed overcome the problem, but I stress the word optimum. For most hobbyists, myself included, feeding is not an exact science. A bit of Aquasol or Nitrosol in a bucket with some sort of inexpensive spraying aparatus, once every couple of weeks, is about average, and at times I really do wonder how much better our plants would grow under more strictly formulated feeding programmes.

Needless to say, I have now resurrected treefern fibre as a basic medium for many of my orchids, although I now regularly use several different host substances. I still use cork for certain things, some of the smaller *Sarcanthinae* species in particular, and both ironbark totems and weathered hardwood have proven to be most useful. Coconut husk has also been successful for many orchids and I am using it for quite a few of the tropical *Dendrobium* species, as well as assorted other experiments. Apart from the previously mentioned root growth problems associated with treefern fibre, this medium also has the reputation of becoming more acid with age, and eventually "souring" to the point where it is no longer suitable for orchid growth. I feel this problem has been overstated somewhat down the years, for in only a very few instances have I experienced this. Too much water, or, more correctly, continuously damp to wet conditions, will cause treefern fibre to break down, but this is a symptom of overwatering, not an inherant characteristic of treefern fibre. There is, of course, a very slow natural break down of the fibre but this is not "souring", and may well be the factor which makes treefern such a good long-term host in cultivation. As opposed to cork, this slow break down releases very small amounts of trace elements and these act as a buffer, allowing the orchid to progress, rather than using up its stored reserves to produce new growth. In cultivation, pseudobulbous orchids,*Dendrobium* and *Bulbophyllum* included, are capable of surviving and, indeed, of apparently progressing, for several years, by expending their stored reserves. But eventually, they run out of energy and at this stage they lose vitality and begin to regress. *Sarcanthinae* species are also able to "live off themselves" for a while, but they too suffer the same fate if not provided with adequate food. Some of the smaller species, particularly those which commonly grow on bare, peripheral twigs and branches, would appear to be only minute feeders and require only slight quantities of mineral nutrients to maintain themselves in healthy condition. It is these types which I have continued to mount on cork in my collection.

I should state here that the opinions expressed above are my own, based on my own cultural experiences. It may be unfashionable to be using treefern fibre but it works for me under my conditions. Many growers are using cork slabs exclusively and appear to achieve excellent results. As I have said before: each grower must experiment and must continue to observe and assess the results of cultural techniques. What suits one grower may not suit another, but each must reach this conclusion independantly.

Getting back to *Bulbophyllum*, I do believe that treefern fibre is the premier host, and even during my "cork years", I still occasionally used a piece of treefern where I considered extra moisture was required. It is the moisture holding capacity of treefern fibre which makes this medium the obvious choice for these species, occuring as they commonly do, in areas and regions where they receive plenty of water. Basically, the genus is a moisture loving one, and though some of its species have adapted to somewhat drier conditions, even these are still dependant upon regular water, and really cannot stand to dry out totally for very long. Nearly all of the *Bulbophyllum* species in Australia are strictly rainforest plants. Their need for more or less permanent moisture is evident by their generally fine, filamentous roots which, unlike many other orchid roots, are not well adapted to dry conditions. They have only a very thin layer of velamen (the absorbant, white coating on an orchid root), the material responsible for protecting the orchid root from dehydration. Keeping this in mind, look at the roots of *D. speciosum,* for example. They are thick and white when dry, indicating this plant's ability to colonise areas which may be seasonally dry. Many of Australia's orchids are the same, although *D. speciosum* is one of the hardiest. Even most of the *Sarcanthinae* species are able to withstand periods of dry weather without any ill-effect, and may actually require some seasonal fluctuations to maintain good health. It is my opinion that too many of these orchids have been killed in cultivation by overwatering rather than the reverse.

B. minutissimum is one of the few members of its genus which I do not grow on treefern. As previously stated, it performs so well on weathered hardwood that I am not inclined to try it elsewhere. Because of its size it would probably have difficulty growing on treefern anyway, as it may get lost in between the fibres. Also, it does not really require a moisture retentive host, for it is one of those species which has successfully adapted to drier conditions, perhaps more so than any other *Bulbophyllum* in Australia.

After completing the body of this article, it occurred to me that two definitions or explanations were necessary to avoid confusion.

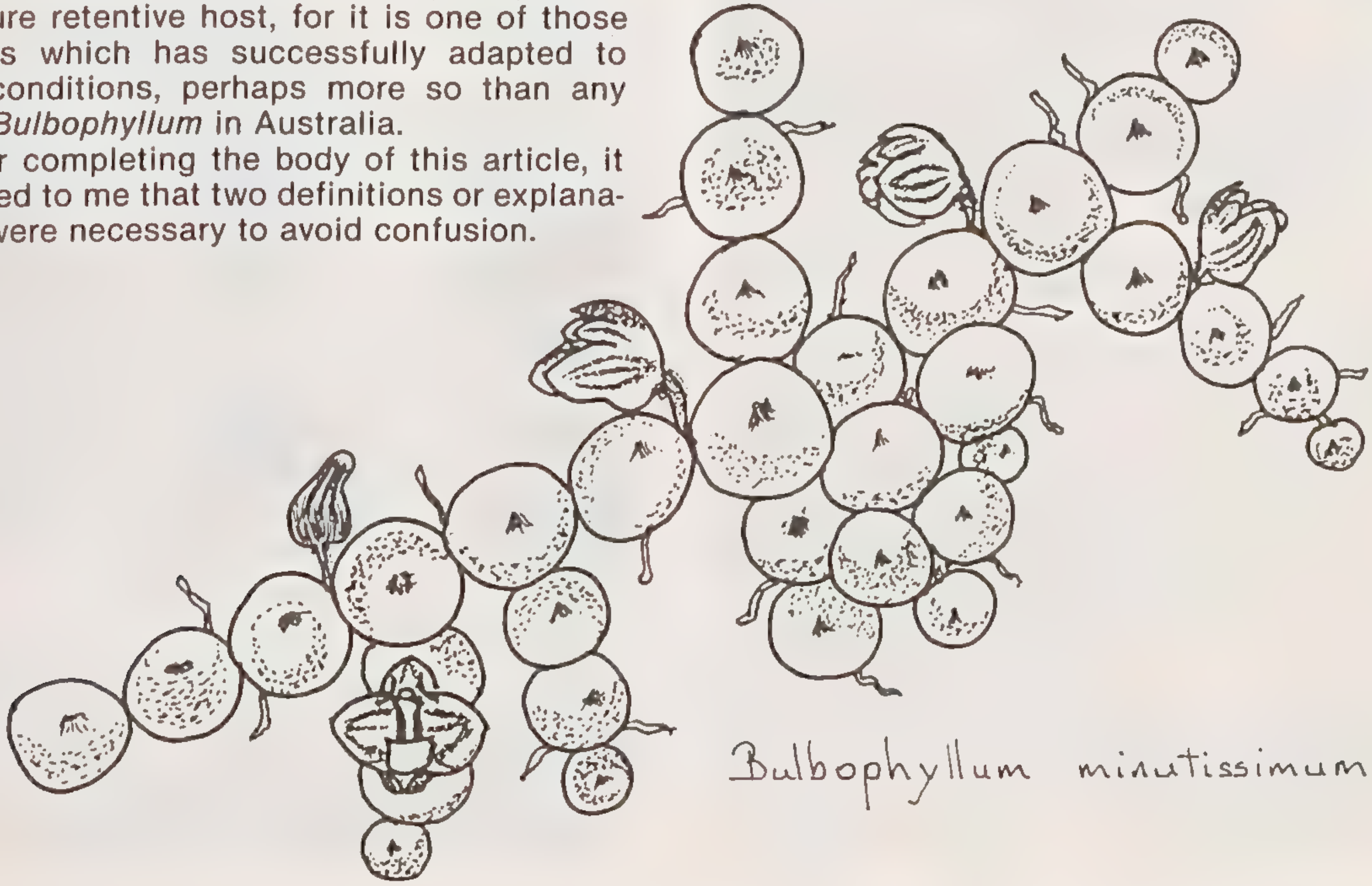
1. By "successful long-term cultivation", I mean a period of at least five years. Although an orchid may grow well for a period of eighteen months or two years, this is really only the period of re-establishment, and the plant cannot be considered as secure until some time after this.

2. As the T.V. ad says, "oils ain't oils", and neither, I realised I had neglected to say, is treefern fibre just treefern fibre. The Soft Tree Fern (*Dicksonia antarctica*), commonly sold in nurseries by the length of the trunk, is light brown in colour. It has soft, spongy fibre which, if too dense, is not suitable except for vigorous, strong-rooted genera eg. *Dendrobium.* The other commonly available type is from the Rough Treefern (*Cyathea australis*). This produces a much harder, more rigid block of fibre, and is generally more suitable for orchids. It is dark brown or grey/black in colour.

Regarding the problem of root-tip necrosis associated with the use of treefern fibre, it seems the older the treefern, the less this is a problem. Freshly cut treefern should not be used, but should be aged before use. Some growers soak treefern fibre in lime-water for 24 hours before using it and this may help to overcome this problem.

Lot 2, Howes Rd
East Kurrajong via
Wilberforce 2756

12 February, 1985



Bulbophyllum minutissimum

An Alternative Method of De-flasking

by Phil Spence

Taking orchid seedlings out of the flask is quite simple if you follow a few simple rules. The following is my way of de-flasking, derived from trial and error over a 20 year period for *Dendrobiums, Sarcochilus, Cattleyas, Phalaenopsis* and most genera except *Cymbidiums.*

The best time to de-flask is Spring and Autumn. It helps if the flask or flasks are placed in the growing tank for a couple of weeks prior to de-flasking, this acclimatizes the plants to the new environment.

Step 1. Preparing pots and medium.
Wash punnets or pots in a weak solution of Milton or Dettol, about ½ strength mixed with hot water from the tap (not boiling) and lightly scrub clean. Allow to drip dry on newspaper. I use Reko 14 cm x 8 cm seedling punnets, white in colour. The potting mix is

2 parts American Sequoia bark, fine
1 part charcoal, fine
1 part Casuarina bark (Australian), fine
1 part Perlite.

All the above are pre-sieved through 2 sieves, 8 mm (3/8"), then 3 mm (1/8"), keeping what stays in the 3 mm sieve. The individual mediums, once the required parts are obtained, are to be dust free. These are then combined and placed in a large pot (10" or 12"). A second 10" pot is prepared with large bark pieces 12 mm (1/2") to 18 mm (3/4"), this is used as drainage in the punnet. I then mix up a 10 litre bucket of Formula 20 (4 times stronger than label) with hot water from the tap, making sure that the Formula 20 is mixed well with the water. I slowly pour the water over the potting mix which is allowed to cool. Quarter fill the punnets with large bark and top with fine bark and allow to drain. One should make sure that the holes in the pot do not clog. When the mix cools it retains about the right moisture to pot the seedlings.

Step 2. Growing Area.
The growing area I use is a large fish tank 1/2 filled with water and placed indoors. The water is treated with Fongarid, and a tropical fish tank heating element is fitted. A shelf made of wire mesh or a sheet of glass is fitted in the tank, suspended on upended glass jars or pots about 25 mm (1") above the water surface.

The tank should be placed in good light as far away from the outside elements as possible, yet still getting fairly good air movement. The reason for this is to minimise damage by small insects and to maintain an even temperature. My tanks are near a window which is painted with white water paint to screen the sunlight, also the inside room temperature is much more even.

Step 3. De-flasking.
Remove the lid from the flask and shake out the contents onto newspaper. If the contents will not come out, break the flask with a hammer. Wash the agar off under a slow running cold tap (if water is very cold, add a little hot), being very careful not to separate plants any more than necessary or to break or damage the roots or foliage.

Once washed clean, the seedlings can then be rinsed in a weak solution of fungicide solution, about 1/2 strength. My first preference is Previcure N by Schering A.G., second preference Fongarid by Ciba Geigy. I like using an old ice cream container to do this in. Always wear rubber gloves when using these chemicals.

After the seedlings are rinsed, place on newspaper and allow to dry for about 2 hours, this is very important. The seedlings are then potted up in the punnet. If the seedlings stick together do not try to separate them, just put the pea sized potting media around them as best you can. I find tilting the punnet on its side about 45° and gently sprinkling the media around the seedlings is the best way. Be

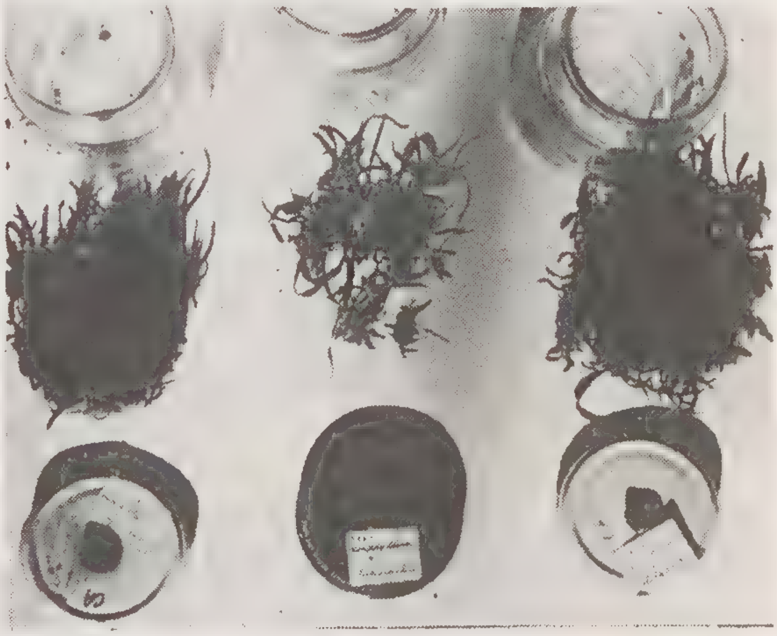


Fig. 1.
De-flasked seedlings

careful not to damage the roots, bury the seedlings or get potting media in the apex of the growths. Do not worry if the seedlings stick together or there is any multiplication of growth, they will grow apart and separate very easily when potted on at a later date.

Step 4.

Place the punnet in tank and do not water for the next 2 days, (the seedlings have to dehydrate slightly so as to seal the pores of the plant, in other words, to harden it for the elements).

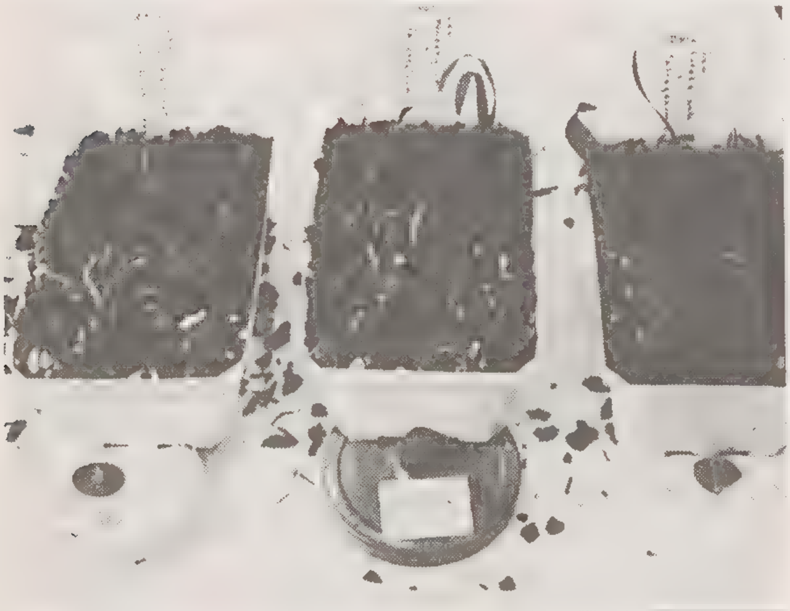


Fig. 2.
Potted seedlings (note that clumps have been left intact)

Step 5.

The morning of the third day, using a watering can, not a fine mister, water well using a light fertilizer. I use Thrive and Fongarid 1/2 strength. A watering can is used to drench the potting mix, not wet the plants, a mister only wets the plants, allowing foliage problems to occur. Existing roots should not die but the ends should start to grow within a week or two and new roots appear.

Water, feed and fungicide every 2-3 days as for normal plants. You will find the biggest problem is with thrips, a small fly which lays its eggs at the bottom of the seedlings, a small caterpillar, about 1 mm long, then eats into the base of the seedlings, quickly turning into a fly and flying away before you know it. A rot then sets in at the damaged point and you loose the seedling. If you are not quick enough to remove the seedling the rot will spread. If I find this happening I allow the seedlings to dry out a little and spray with Lanes House Plant Spray, aerosol insecticide. If this is not available use a pressure pack that contains Pyrethrin. If the problem continues, remove seedlings from punnet and wash clean, then re-pot in new materials and treat as de-flasked seedlings.

Note:

- Allow the seedlings to dry for two days when you first de-flask.
- Use watering can when watering at all times.
- Rain water is better than tap water, but not essential.
- Check that the tank is not too full so that the water is away from the bottom of the punnet.

Step 6.

When the seedlings show new growths and roots they can then be put with your other plants.

Potted seedlings after 3-4 weeks (note root systems)

Author's Footnote:

Sometimes plants in purchased flasks are disturbed in transit, allowing infection to enter. Remove the lid and pour in a solution of fungicide. Let stand for about 1 hour then remove plants from the flask. Remove any mould from the seedlings, discarding any rotten or damaged plants. The remainder are allowed to dry on newspaper for 24 hours then potted as suggested above. This method has given me good results.

Good luck.

Phil Spence,
Orchid Productions,
P.O. Box 102,
Forestville 2087.

Amendments to the Description of *Thelasis carinata* Bl.

by David L. Jones

Introduction

Thelasis carinata Bl. was first recorded for Australia by Dockrill (1970), the record being from the McIlwraith Range. This species is fairly common overseas, extending from southern Asia, through Malaysia and the various islands of the Philippines, Indonesia and New Guinea to northern Australia where it is restricted to Cape York Peninsula. In Australia it was believed to be confined to the McIlwraith Range but the Australian Orchid Foundation expedition of 1977 into the Iron Range found it to be fairly common there in some areas (Lavarack 1977). This extension of range was a welcome find since the species appears to be localised and rare in the McIlwraith Range.

Dockrill's paper of 1970 includes a description of *Thelasis carinata.* While carrying out a detailed study of the system of self-pollination adopted by this orchid, I became aware of considerable deficiencies and discrepancies in this description. On checking overseas literature I found that descriptions of this orchid are few and far between and those that are available lack detail on important structures, such as the column and pollinarium (e.g. Holttum 1957). The original description by Blume (1825) is not only difficult to obtain but is uninformative. In this paper I include a detailed description of the orchid as compiled from specimens collected in the McIlwraith Range and Iron Range areas of Cape York Peninsula.

Description

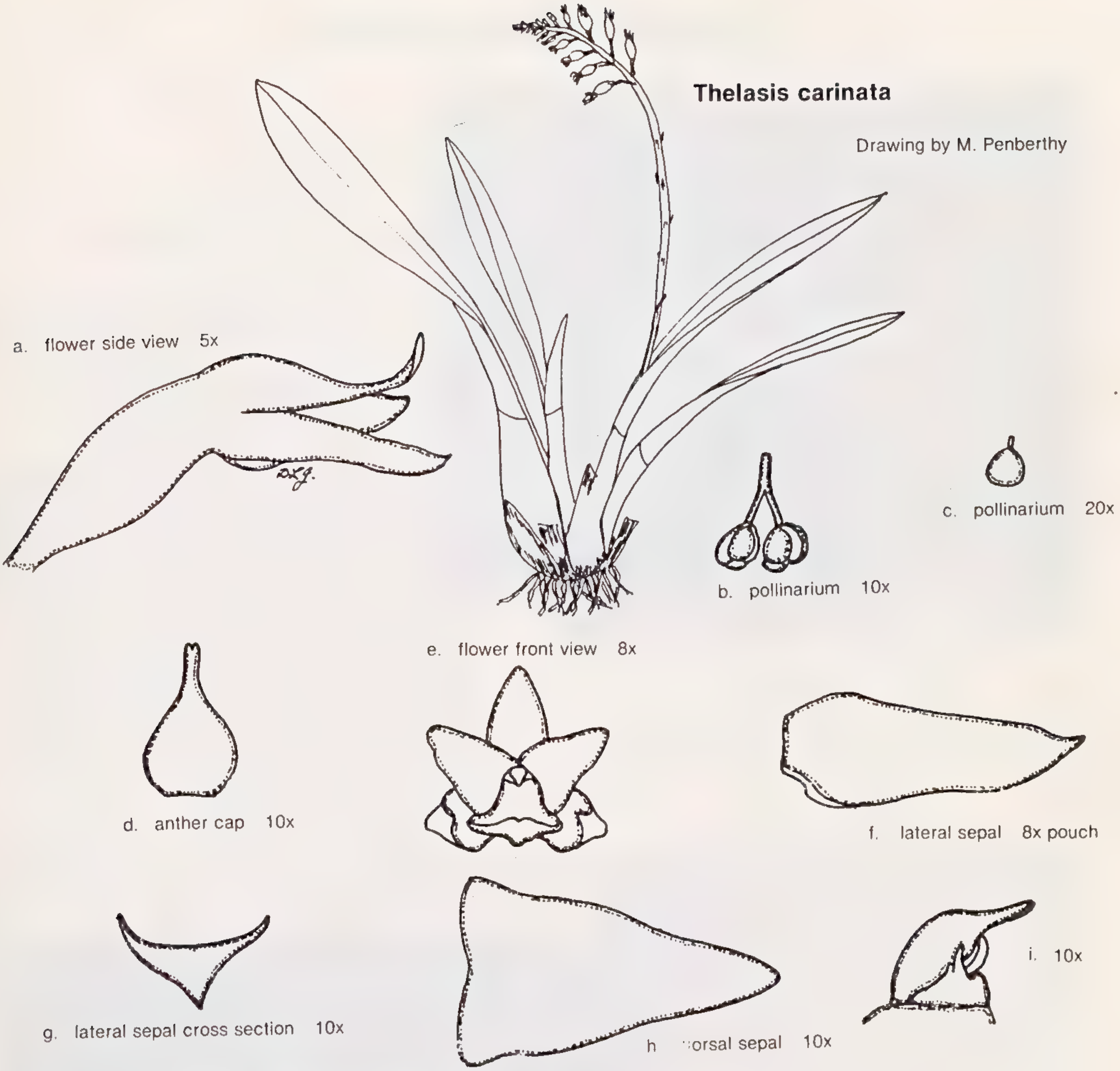
Pseudobulbs 2-5 cm across, flattened laterally, in tufts of 2-6; leaves 3-6 (usually 5), the lower leaves bract-like and sheathing the pseudobulb, the upper leaves longest; leaf-bases 3-5 cm long, imbricate, sheathing the pseudobulbs; leaf-lamina 10-30 cm x 1.5-2.8 cm, linear-oblong, erect and complicate near the base, then flattening and spreading, dull green; mid-vein prominent on the underside, ridged; apex bilobed, unequally emarginate; inflorescence arising in a leaf axil, racemose, 15-40 cm long; peduncle slender, 10-30 cm long; bracts 3-5, 4-6 mm long, subulate, sheathing at the base; flowers 6-15 per raceme, 9-12 mm long including ovary; pedicel 1-2 mm long; ovary 4-6 mm long, strongly triangular, the angles winged or ridged; flowers 5-7 mm long, tubular, green and gibbous in the basal half, the perianth segments spreading and white in the upper half; dorsal sepal 4-5 mm x 2-3 mm when flattened, broadly triangular, acute or blunt at the apex, the tip recurved; lateral sepals 4-5 mm x 1.5-2 mm, curved about halfway along the length, narrowly triangular, unequally widened near the base, falcate, tapering to a blunt apex, triangular in cross-section; petals 4.5-5 mm x 1-1.5 mm, oblanceolate, blunt at the apex, rounded at the base; labellum 3.5-4.5 mm x 2-2.5 mm when flattened, strongly cordate at the base, constricted near the middle, downcurved, blunt or shortly acute at the apex; callus broad at the base where there appear to be two nectary-like swellings, then tapering and narrowing to the apex; column 1-1.5 mm tall, without a foot; column wings 0.3-0.5 mm long, bilobed, the anterior lobe short and blunt, the posterior lobe long and linear; rostellum 0.5 mm long, linear; stigma 0.5 mm x 0.8 mm, oblong; anther-cap 2 mm long, lageniform, the rostrum 0.5 mm long, bifid; pollinarium consisting of a degenerate retinaculum, bifid stipe and 8 pollinia; retinaculum 0.5 mm long; stipes 0.6 mm long; pollinia 0.3 mm x 0.3 mm, orbicular, yellowish.

Discrepancies

The major deficiencies in other descriptions of this orchid occur in details of the pollinarium. In all of the Australian specimens examined this organ cannot be extracted as a unit, even from freshly opened flowers. The retinaculum is quite degenerate and provides no means of attachment to an insect. In addition the stipe is bifid, not entire as shown in the drawings of Dockrill and Holttum. A branch of the stipe runs down each side of the anther sac and rostellum to a group of four pollinia.

The perianth segments also differ by being blunt rather than long-acuminate as illustrated by Dockrill. In the flower they frequently appear acuminate because of folding but when flattened are, in fact, blunt. It is interesting to note that the lateral sepals are strongly ridged, fleshy and triangular in cross-section, a factor mentioned by neither Dockrill or Holttum.

The above discrepancies are significant and suggest that a detailed comparison should be made between Australian and overseas material of *Thelasis carinata.* As the Australian plants are invariably autogamous it is quite

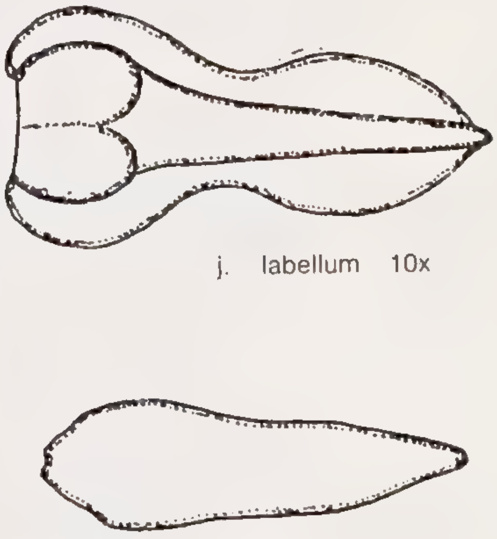


possible a distinct population has evolved to meet the requirements of the monsoonal rainforests of Cape York Peninsula.

References

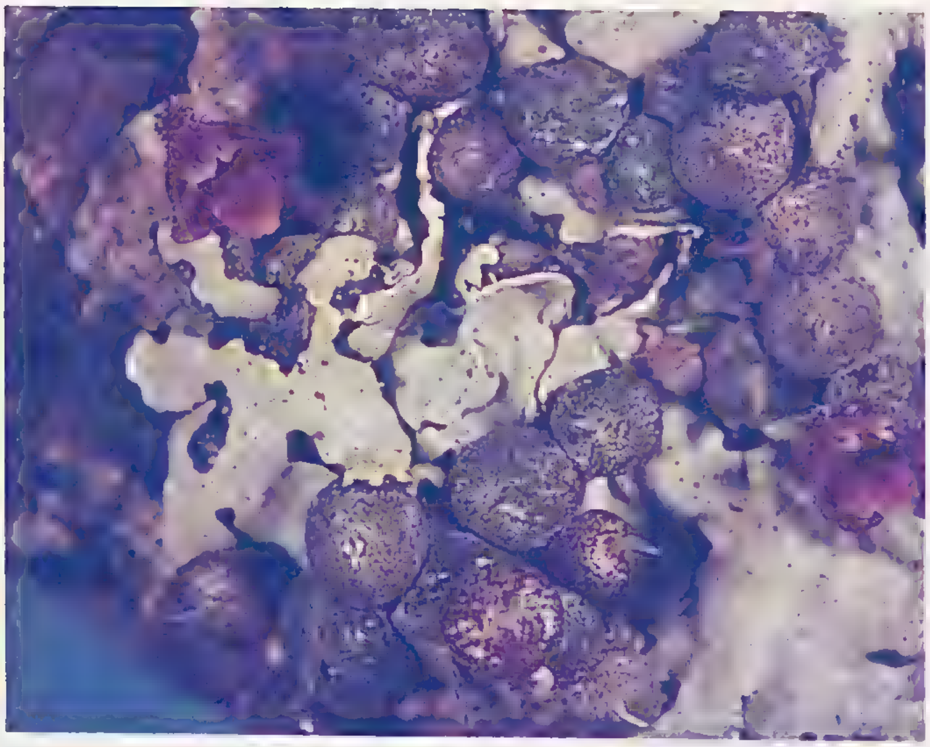
Blume, Bijdr. 385 (1825).
Dockrill, A.W., *Australian Plants* **6** : 30 (1970).
Holttum, R.E., *Flora of Malaya* **1** : 550 (1957).
Lavarack, P.S., *Orchids of the Iron Range Area,* Australian Orchid Foundation Report (1977).

David L. Jones
P.O. Box 261
Palm Beach
Qld. 4221.



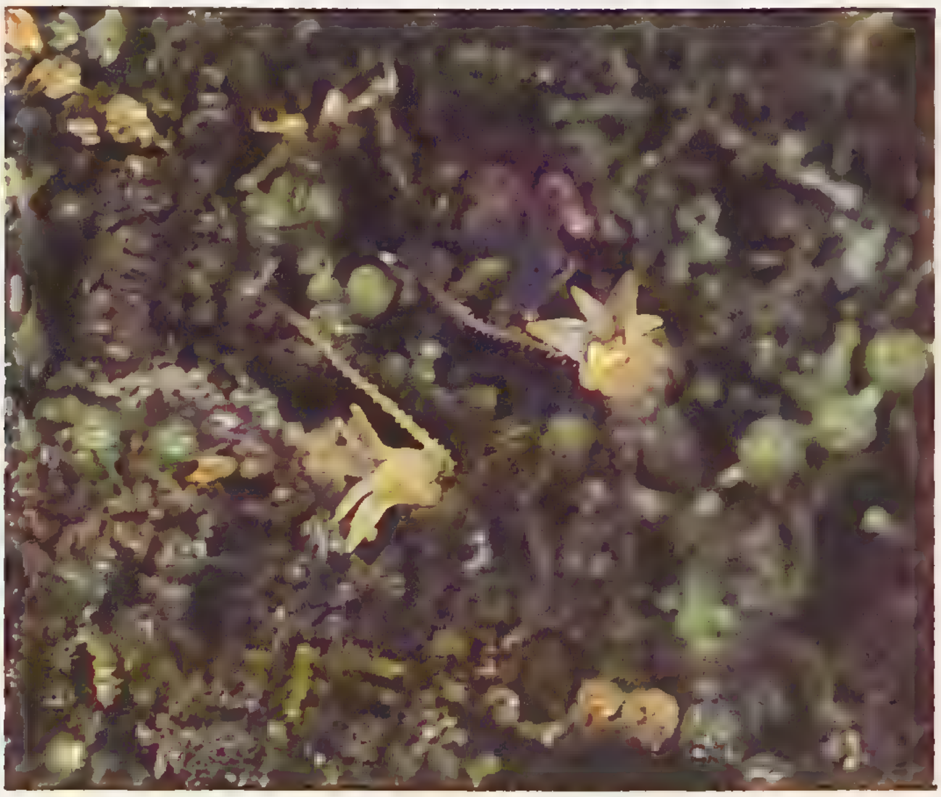
Drawings by D.L. Jones

Bulbophyllum minutissimum



The lichen amongst which this orchid is often found growing, is clearly visible in this photograph. The leaves can be seen on some of the pseudobulbs at the bottom.

Bulbophyllum globuliforme

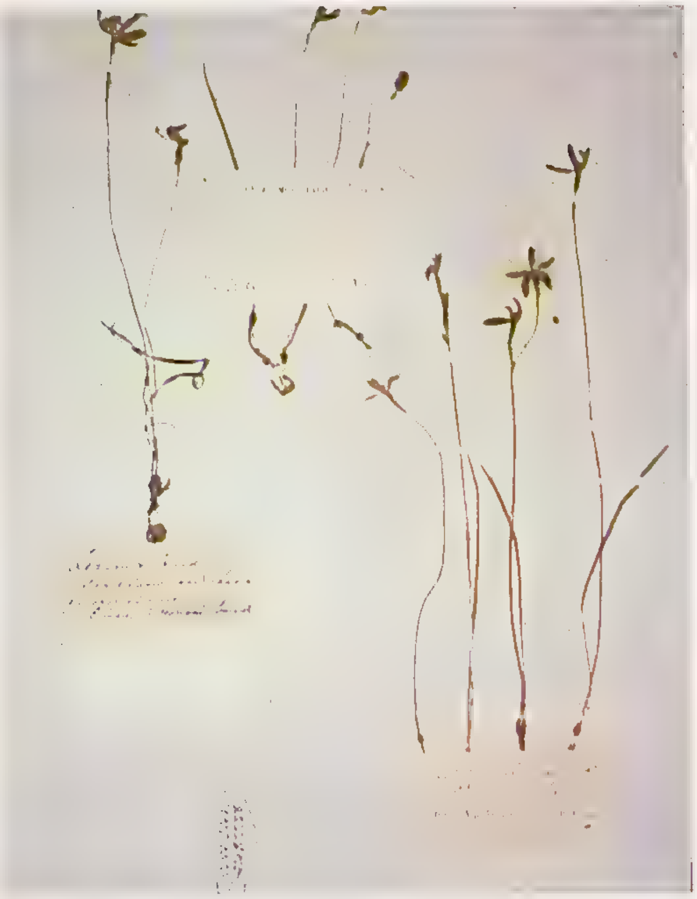


The dense clumping habit is clearly evident here as is the long peduncle with its creamy coloured flower.

Photographs by courtesy of M. Corrigan.

John Lindley's Orchid Herbarium

Fig 1 The Type of *Arethusa catenata* Smith.



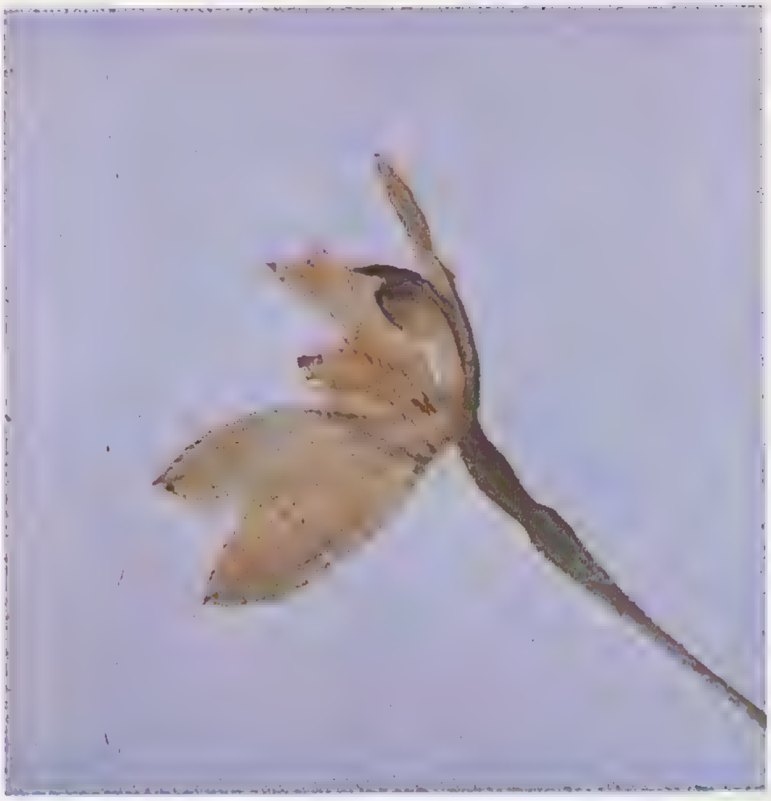


Fig 2 The Type of *Caladenia angustata* Lindley.

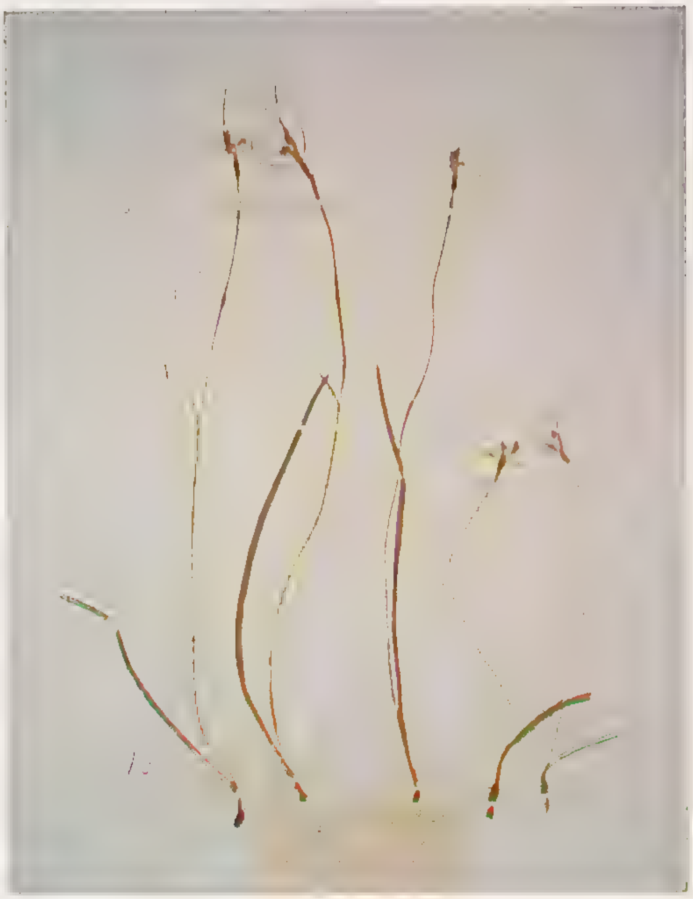


Fig 3 The Type of *Caladenia pallida* Lindley

Photographs by courtesy of Royal Botanic Gardens, Kew.

Pterostylis plumosa (barbata) in the Cornwallis area, New Zealand

by E.D. Hatch

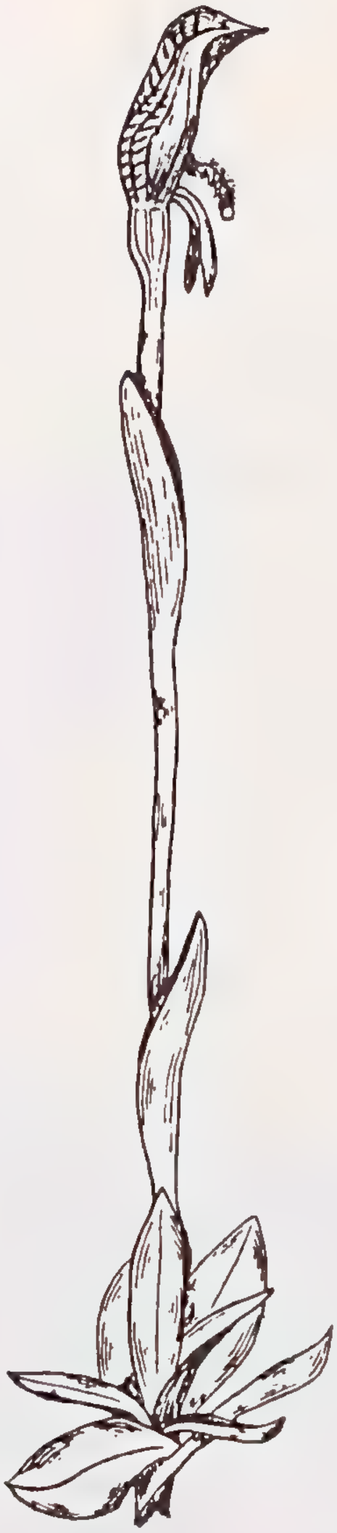
(We publish this brief article with acknowledgement to the Auckland Botanical Society's Newsletter 39: Jan. 1984, p. 18. It is of interest particularly to those who have followed the three articles in the *Orchadian* since December, 1979. Doubts about the nomenclature — *plumosa* and *barbata* — were apparent from the first of these articles, by Peter Vaughan, *Orchadian* Vol. 6, p. 138-139, and relevant references and drawings were supplied by J.J. Betts, as Editor. This resulted in "Another look at *Pt. barbata* and *Pt. plumosa* in Western Australia by Andrew Brown, *Orchadian* Vol. 6, p. 182, with illustrations by Collin Woolcock. A further look at the problem with photographs, was contributed by Ron Heberle, *Orchadian* Vol. 7, No. 2, p. 36, December, 1981. A new book "Orchids of South-West Australia", by N. Hoffman and A. Brown, 1984, provides two excellent colour photographs, of *Pt. barbata* and *Pt. plumosa* but throws no further light on the subject. The present article by E.D. Hatch is further evidence of the need for trans-Tasman co-operative studies between Australia and New Zealand. — J.J. Betts.

Fifty years ago the manuka scrub on the Cornwallis gumland was very much shorter than it is at present, often no more than knee-high, and was scattered through with quite large patches of bare yellow clay. The tracks were kept open and the firebreaks between the pines systematically ploughed. This freshly-turned soil was a favourite germinating place for *Pterostylis plumosa*, and there is in Auckland a specimen which I collected from Mill Bay in October 1932.

It is worth mentioning here that this species does not reproduce by multiple tubers and spreads only by seed. It is also very dependent on mycorrhiza and cannot be cultivated with any success.

The Kaitarakihi peninsula was another area which was largely bare clay, and was often burnt over, deliberately or by accident, I cannot now remember. *Pterostylis plumosa* was frequent here too, but tended to disappear as the scrub grew taller, and was particularly choked out by the fern *Gleichenia dicarpa. P. plumosa* was last recorded from here by Mrs Katie Wood (*Auck. Bot. Soc. Newsletter* Sept. 1951, p. 3). Recent clearing by the ARA has produced some suitably bare soil and I was pleased a few weeks back to find 2 plants of *P. plumosa* about 3 seasons old, with well-developed seed capsules. The peninsula is open to the Tasman and the south-west wind and the seed may have re-arrived from Australia, or may have come from some hidden local source.

Since clearing began on Kaitarakihi there has been a noticeable increase in the number of plants of *Thelymitra carnea* and *Caladenia catenata* var. *calliniger. Prasophyllum pumilum* on the other hand, appears to be decreasing. In 1958 I recorded 26 flowering plants, in 1983 only 1.



Reprinted from Auckland Botanical Society Newsletter 39: Jan. 1984, p. 18.

25 Tane Road
Laingholm Auckland 7. N.Z.

Further thoughts on the identity of *Dendrobium alexandrae*

by P.J. Cribb

The recent announcement by Atwood (1984) of the rediscovery of *Dendrobium alexandrae* fills in yet another of the puzzling gaps left by the destruction of the Berlin-Dahlem Herbarium during the last war.

D. alexandrae is an exciting orchid with a flamboyant flower not unlike that of the better-known *D. spectabile.* Rudolf Schlechter discovered it in 1909 growing in the Waria Valley (of what was then German New Guinea) at an altitude of 900-1100 m (Schlechter, 1912). Its long disappearance from view might not be thought surprising because New Guinea is still considered largely under-explored from the botanical point of view. However, the Waria Valley running down to the coast south of Lae in Papua New Guinea has been visited by a number of botanists including orchid collectors. Indeed, Atwood (pers. comm.) thinks that the two plants at Selby may have originated from one of these, namely Andree Millar. The surprising point is, in my view, that only two plants have been collected there. How could such a showy orchid have been overlooked by others?

Most of the forty-seven species currently included in sect. *Latouria,* to which *D. alexandrae* belongs, are relatively widespread species (Cribb, 1983). Even a rarity such as *D. engae* Reeve, described only recently, is now known to be more widespread than originally thought. *D. alexandrae* was also first collected at a relatively low altitude for a species in the section and other low altitude species such as *D. macrophyllum* and *D. bifalce* are relatively widespread in distribution.

In a recent revision of the section (Cribb, 1983) I suggested, on the strength of Schlechter's illustration, that *D. alexandrae* exhibited remarkable similarities to *D. spectabile* and also that it might have originated as a hybrid of *D. spectabile* with another species possibly *D. macrophyllum.* Natural hybridisation between *D. rhodostrictum* and *D. ruginosum* in Bougainville has already been reported in the section (Cribb, 1983).

I have no doubt that the Selby plant agrees well with Schlechter's description and illustration of *D. alexandrae.* Observation of a slide of the Selby plant and a flower preserved in alcohol kindly sent to me by John Atwood provides convincing evidence of the hybrid origin of this taxon. *D. alexandrae* possesses the overall floral form of *D. spectabile* with tapering undulate petals, tapering elongate sepals and a lip in which the mid-lobe is almost twice as long as broad. It differs however in its slightly smaller dimensions, the shorter broader mid-lobe of the lip which is more or less spotted, the subquadrate side lobes of the lip, and the creamy petals boldly spotted with maroon.

Only two other species of sect. *Latouria* have these features. The first is *D. polysema,* a widespread and variable species in New Guinea generally found at higher altitudes than *D. spectabile.* It is difficult to see, however, how it could have given to its offspring the subquadrate side lobes to the lip found in *D. alexandrae.* The second and more likely candidate for the other parent of *D. alexandrae* is *D. macrophyllum.* This is a common and widespread orchid in New Guinea and with an altitudinal range that overlaps with *D. spectabile.* Furthermore, its flower colouring and broad side lobes to the lip agree well with those of *D. alexandrae.* It is therefore hard to avoid the conclusion that *D. alexandrae* is an infrequent hybrid of *D. spectabile* and *D. macrophyllum.*

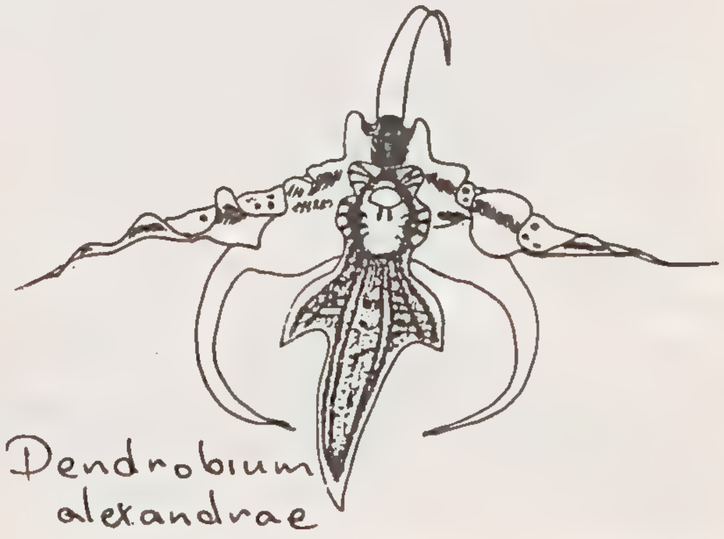
References

Atwood, J. (1984). The identity of *Dendrobium alexandrae* Schltr. American Orchid Society Bull. 53 : 1178-1179.

Cribb, P.J. (1983). A revision of *Dendrobium* sect. *Latouria* (Orchidaceae). Kew Bull. 38(2) : 229-306.

Schlechter, R. (1912). Die Orchidaceen von Deutsch — Neu Guinea. Fedde, Repert. Beih. 1 : 440-643.

**c/o Royal Botanic Gardens,
Kew, Richmond,
Surrey TW9**



Notes on the Content of John Lindley's Orchid Herbarium — 4 : Caladenia

by M.A. Clements

Summary. Details of *Caladenia* specimens in John Lindley's orchid herbarium at Kew are given.

Introduction. The genus *Caladenia* is one of the largest in Australia and New Zealand currently comprising about 75 species. The greatest diversity in the genus is to be found in the south-west of Western Australia. Many of the species Lindley described originated from this area, mostly collected by James Drummond (1784-1863). Most of the remaining material studied by Lindley (from eastern Australia) was collected by Allan Cunningham (1791-1839) or Ronald Gunn (1808-1881).

Many of the species Lindley described have been poorly understood until recently. George (1971) considered all of the Western Australian taxa and a few of the eastern species. He greatly improved the understanding of those species. However, several problems relating to Lindley species have remained unresolved until now. Recently Hopper (in preparation) has re-examined the status of many western and some of the eastern Australian species. He has found that some of Lindley's names which have been relegated by some authorities to synonymy, refer to distinct taxa.

Methods. The methods used are those described in the first paper of the series (Clements, 1983) and the reader is referred to it to establish the procedure.

In the first 2 papers of this series tracings of line drawings by Ferdinand Bauer have been cited. With the help of Ms Judith Diment, Librarian of the Herbarium at the British Museum (Natural History), it has been established that these drawings are originals traced in ink by Bauer from his own pencil drawings made in the field in Australia between 1801-05. Bauer accompanied Robert Brown on Matthew Flinders' circumnavigation of Australia so many of these are undoubtedly drawings of Brown's types.

Acknowledgements. This study was financially supported by the Sainsbury Trust (to whom I am most grateful) through the Bentham-Moxon Trust at Kew. I wish also to thank the Director of the Royal Botanic Gardens, Kew and the Keeper of the Herbarium for permission to use their facilities and reproduce colour photographs of the types and in particular Phillip Cribb, Royal Botanic Gardens, Kew, and Stephen Hopper, Western Australian Wildlife Research Centre who have read and commented on this manuscript and also Judith Diment for her assistance with the Bauer drawings.

CALADENIA R.Br.

C. caerulea R.Br.

15. A line drawing by F. Bauer labelled "Port Jackson Sydney No. 1292 (775)".

16. c) "Fl. Novae Holl. No. 163" [Sieber] (1 specimen). Note: This specimen has been initialled by J.D. Hooker as if to indicate approval of the determination.

C. carnea R.Br.

2. b) (As *C. alba* R.Br.) "New South Wales, 1855", W. Catlett (2 specimens).

5. b) "New South Wales, 1855", W. Catlett (1 specimen).

c) (As *C. alata* R.Br.) "Van Diemensland", C. Stuart ex Plantae Muellerianae (3 specimens).

d) (As *C. alata* R.Br.) "Nov. Holl.", F. Mueller (1 specimen). Note: Mueller has, typically, appended a detailed Latin diagnosis of the species on the label.

6. a) "Tasmania", Archer (6 specimens).

b) A lithograph of the species taken from J.K. Hooker's Fl. Tasman. (1855-59).

7. a) "Circular Head, Insula Van Diemen., Oct.-Nov. 1837", R. Gunn 606 (3 specimens plus a line drawing of a lip). Note: Some of the plants on this sheet appear to fit the recently described *C. pusilla* W.M. Curtis. The latter is probably no more than a variant of *C. carnea* in which the lateral sepals are joined for all or part of their length.

b) "Circular Head, Insula Van Diemen., Nov. 1837", R. Gunn 912 (5 specimens including 2 in a packet plus a line drawing of a lip). Note: There is a note accompanying the drawing of the lip stating "varies much in the form of the labellum".

c) "Port Jackson, 1803-05", R. Brown (3 specimens). SYNTYPE of *C. carnea.*

Note: In recent years most botanists have considered *C. carnea* to be conspecific with *C. catenata* (J.E. Smith) Druce (eg. Halle, 1977; Curtis, 1979 and Blaxell, 1980). However, following examination of the holotype of *Arethusa catenata* in the Smith Herbarium at LINN (Fig. 1.) it is apparent that this concept is incorrect (Clements and Cribb in press). The holotype of *A. catenata* consists of two specimens of the species formerly known as *C. alba* R.Br.

8. b) (As *C. angustata* Lindley) "Nov. Holl.", M. Vereaux ex Herb. Mus. Paris. No. 158 (3 specimens). Note: These specimens are on the same sheet as the holotype of *C. angustata* Lindley.

C. carnea R.Br. var. *minor* (J.D. Hook.) Hatch

b) (As *C. minor* J.D. Hook.) "N. Zealand", J.D. Hooker (4 specimens). Note: The specimens on this sheet and those figured by Hooker do not represent typical *C. carnea* R.Br. Since the name *C. carnea* has been reinstated it also is appropriate to reinstate the var. *minor.*

26. a) (As *C. minor* J.D. Hook.) A lithograph of the variety taken from Hooker's Fl. Nov.-Zel. (1852-55).

C. catenata (J.E. Smith) Druce

1. (As *C. alba* R.Br.) A line drawing by Bauer traced from his original pencil sketch of the species and labelled "Sydney Hawkesbury No. 1291 (754)".

2. a) (As *C. alba* R.Br.) "Port Jackson, 1802-5", R. Brown (3 specimens including one in a packet). SYNTYPE of *C. alba.*

5. a) (As *C. alba* R.Br.) "South Coast N. Holland", Miller (5 specimens plus a line drawing of a lip).

8. a) (As *C. angustata* Lindley) "E. Coast New Holland in loam and sand; dry places shaded by forest trees", Burnett (3 specimens including one in a packet). Note: For further details on the identity of this species see Clements and Cribb (in press).

C. clavigera Cunn. ex Lindley

23. a) (As *C. pulcherrima* F. Muell. ms) "Austral. felix", [F. Mueller] (1 specimen). Note: The specimen was in a packet on the sheet that also contained a specimen of *C. patersonii* R.Br. These specimens have now been separated into 2 packets and annotated accordingly.

48. a) [Tasmania] R. Gunn 344 (3 specimens, one with a slip missing; plus a sketch of a lip). SYNTYPE of *C. clavigera*

b) "Vale of Clwyd, Blue Mountains, Oct. 1825", A. Cunningham (3 species including one in a packet). SYNTYPE of *C. clavigera.* Note: on the attached label Lindley wrote "*C. clavigera* C. closely allied to *C. filamentosa* Br." — There is also a Latin description of the species in Cunningham's and on this label.

49. a) (As *C. pulcherrima* F. Muell. ms) "N. Holl. austr.", F. Muell. (1 specimen).

b) A lithograph of the species taken from Hooker's Fl. Tasman. (1855-59).

C. congesta R.Br.

12. a) "Tasmania", Archer (7 specimens).

b) A lithograph of the specimens taken from J.D. Hooker's Fl. Tasman. (1858-60).

C. deformis R.Br.

16. a) (As *C. caerulea* R.Br.) "Nov. Hollandia austral.", F. Mueller ex Herb. W. Sonder (2 specimens). Note: Hooker has written in pencil both *C. deformis* and *C. barbata* over the earlier determination of these specimens.

b) "Mount Nelson, Tasmania, 1843", M. Verreaux 935, 936 ex Herb. Mus. Paris. No 159 (2 specimens). Note: These specimens were originally determined by Hooker.

18. a) (As *C. barbata* Lindley) "Van Diemensland", R. Gunn 347 (3 specimens plus a sketch of a lip). HOLOTYPE of *C. barbata.* Note: The specimens were determined as *C. deformis* by A.S. George on 17/1/1968.

b) (As *C. barbata* Lindley) A lithograph of the species taken from Hooker's Fl. Tasman. (1855-59).

c) (As *C. barbata* Lindley) [no date] (3 specimens). Note: All specimens on this sheet were determined as *C. deformis* R.Br. by Clements on 14/11/83.

19. a) (As *C. unguiculata* Lindley) "Swan River, 1839", Drummond (3 specimens and a sketch of a lip). LECTOTYPE of *C. unguiculata.* Note: The lectotype was chosen by George on 17/1/1968.

b) (As *C. unguiculata* Lindl.) "Black sand, dry places", Molloy (6 specimens). SYNTYPES of *C. unguiculata.* Note: The names *C. barbata* Lindley & *C. deformis* R.Br. were written in Hooker's hand, above Lindley's original determination. However, the current opinion is that these belong to the single rather variable species *C. deformis* (George, 1971).

C. denticulata Lindley

14. "Swan River, 1839", Drummond (7 specimens including 4 flowers in a packet and a colour sketch of a lip). HOLOTYPE of *C. denticulata.* Note: This taxon was reduced to a variety of *C. filamentosa* R.Br. by George (1971); a determination that has been accepted by most botanists (eg. Clements, 1982). However, recent research by Hopper (in preparation) suggests that this taxon merits specific rank. I am now of the same opinion as Hopper.

C. dilatata R.Br.

38. a) "Tasmania", Archer (6 specimens).

b) A lithograph of the species taken from Hooker's, Fl. Tasman. (1855-59).

c) "Tasmania, anomalous flower with 2 labellums" (1 specimen in a packet). Note: The specimen has deteriorated since collection to the point where it is no longer possible to see what it consists of.

40. a) (As *C. alata* R.Br.) "New South Wales, 1855", W. Cattlet (3 specimens).

b) (As *Leptoceras*) "Nangus", McArthur 176 (2 specimens).

41. a) "Bathurst, N.S.W., in sandy forest country (formation granite), Oct. 1822", A. Cunningham (2 specimens).

b) (As *C. pulcherrima* F. Muell. ms.) "Lofty Ranges, Nov. Holland, meridional" [South Australia], F. Mueller (1 specimen).

c) "Interior of New Holland; green plains of the south, 1836," Major Mitchell (2 specimens including one in a packet).

C. dilatata R.Br. var. ***falcata*** Nicholls

39. b) "Swan River", Drummond 440 (3 specimens including one in a packet). Note: This specimen was also determined as *C. longicauda* Lindley and *C. lobata* Fitzg. by Rolfe, both determinations being written in pencil. It was later determined as *C. dilatata* R.Br. by George on 15/11/1968, but correctly it is the var. *falcata* Nicholls as determined by Clements on 16/11/1983.

C. dimorpha Fitzg.

4. b) (As *C. congesta* R.Br.) [No data] (2 specimens including one badly damaged flower in a packet). Note: Details on the label accompanying this specimen are given as "Swan River, Capt. James Mangles R.N.", but *C. dimorpha* is not a Western

Australian species rather it is found in the highlands of south-eastern Australia. Indeed; Rolfe pencilled in next to the specimen "Not W.A.!" The error was probably Lindley's. Confusion exists to the exact identity of this species. Fitzgerald illustrated and described 2 species under this name; one is *C. gracilis* and the other is *C. dimorpha*.

C. discoidea Lindley

35. "Swan River, 1839", Drummond (7 specimens including 2 flowers in a packet plus a sketch of a lip). HOLOTYPE of *C. discoidea*.

C. filamentosa R.Br.

36. a) (As *C. pulcherrima* F. Muell. ms) "Encounter Bay, [South Australia] Nov. Holland meridional", F. Mueller (1 specimen). Note: Lindley has written *'C. filifera?'* in pencil on the label.

b) "Tasmania", Archer (3 specimens with the lip missing from the middle specimen).

c) "South Coast of N. Holland", Miller (1 specimen).

d) A lithograph of the species taken from Hooker's, Fl. Tasman. (1885-59). Note: This specimen was determined as *C. filamentosa* R.Br. by Clements on 16/11/1983.

C. filamentosa R.Br. var. ***filifera*** (Lindley) A.S. George.

13. "Swan River, 1839" Drummond (3 specimens plus a sketch of a lip). HOLOTYPE of *C. filifera*.

C. flava R.Br.

51. a) "K.G. Sd." [King George Sound, Western Australia], Collie (1 specimen).

b) "Swan River", Capt. J. Mangles R.N. (1 specimen).

c) "Swan River, 1839", Drummond (4 specimens including 2 flowers in a packet).

d) "Vasse" [River, Western Australia], Mrs Molloy (2 specimens plus a coloured sketch of a lip). Note: The following note was written on the sheet beside the specimens "Most beautiful; in large head; some flowers streaked; some spotted; roots one of the chief exulents of the natives. Sulph. Orch., under trees". Presumably the tubers of *C. flava* were eaten by the natives from that region.

C. gemmata Lindley

21. a) "Swan River", Capt. J. Mangles R.N. (1 specimen). SYNTYPE of *C. gemmata*.

b) "Vasse [River, Western Australia]; a deep soft blue; grows simply here and there in rich decomposed soil", Mrs Molloy (2 specimens). SYNTYPE of *C. gemmata*.

c) "Swan River, 1839", Drummond (6 specimens including 2 in a packet plus a colour sketch of a lip). LECTOTYPE of *C. gemmata*. Note: This lectotype was presumably chosen by George on 17/1/1968. All specimens have blue flowers.

C. gracilis R.Br.

3. a) (As *C. alata* R.Br.) A lithograph taken from J.D. Hooker's, Fl. Tasman. (1855-59).

b) (As *C. alata* R.Br.) "Tasmania", Archer (5 specimens). Note: The second specimen was determined as *C. gracilis* by Clements on 12/9/1983.

8. c) (As *C. angustata* Lindley) "Circular Head, Tasmania, Insula Van Diemen Nov., 1837", R. Gunn 911 (5 specimens including one in a packet and a sketch of a lip). HOLOTYPE of *C. angustata*. Note: *C. angustata* has been reduced to synonymy under *C. gracilis* by Clements (1982) based on information gained from looking at colour slides of the types of both taxa. I am still of that opinion having since seen the type specimens (Fig. 2). The main diagnostic characters of the species are 4 rows of columnar calli spread evenly along the laminar and the emarginate side lobes of the lip. The mid-lobe margins are usually dentate rarely clavate. *C. gracilis* is also easily recognised in the field by its pungent musk-like odour.

9. a) (As *C. angustata* Lindley) "Tasmania", Archer (7 specimens).

10. (As *C. angustata* Lindley) "Tasmania, Dupe" (1 specimen).

24. (As *Caladenia*?) McArthur 169 (1 specimen including a flower in a packet). Note: This specimen was determined as this species by Clements on 31/1/83.

C. hirta Lindley

50. a) "Vasse [River, Western Australia], black sand", Mrs Molloy (7 specimens including one flower in a packet and a sketch of a flattened lip). LECTOTYPE of *C. hirta*. Note: The lectotype was chosen by George on 5/11/1968.

b) "Swan River, 1835", Drummond (1 specimen). SYNTYPE of *C. hirta*.

C. huegelii H.G. Reichb.

39. a) "Swan River", Drummond 439 (1 specimen). SYNTYPE of *C. huegelii*.

47. b) (As *C. longicauda* Lindley) "Swan River", J. Mangles ? (1 specimen). Note: This specimen was determined as this species by George on 5/10/1968 upon separation from a mixed collection with *C. longicauda*.

C. iridescens R. Rogers

4. a) (As *C. congesta* R.Br.) "Bathurst, in sandy forest grounds in the neighbourhood of, Oct. 1822", Dr. C. Paterson ex Herb. A. Cunningham (1 specimen including a flower in a packet and a sketch of a lip).

C. ixioides Lindley

20. "Swan River, 1839", Drummond (5 specimens including a partly dissected flower in a packet and a sketch of a lip). HOLOTYPE of *C. ixioides*. Note: This taxon has recently been treated as forma *jutea* of *C. gemmata* Lindley (Clemesha 1967). However, the current opinion of several Western Australian botanists, and also of the author, is that the status of this taxon needs careful reconsideration based on both morphological and ecological criteria. It is here listed as was originally described by Lindley. In any event the name *C. gemmata* forma *lutea* is invalid as Clemesha did not cite a type.

C. latifolia R.Br.

27. a) (As *C. mollis* Lindley) "Swan River, 1839", Drummond (1 specimen). HOLOTYPE of *C. mollis*.

Note: *C. mollis* was reduced to a synonym of *C. latifolia* by George (1971).

b) (As *C. carnea* R.Br. and *C. Mollis* Lindley) "N. Holl. austr. Sept. 1827", F. Mueller (2 specimens including 3 flowers in a packet).

c) (As *C. mollis* Lindley) "Vasse [River, Western Australia], black sand", Mrs Molloy (3 specimens and a sketch of a lip). Note: This specimen was determined as *C. latifolia* by Hooker.

51. a) "Circular Head of Woolnorth, Insula Van Diemen. Sept.-Oct. 1837", R. Gunn 750 (7 specimens including 2 flowers in a packet).

b) "Woolnorth, Insula Van Diemen. Oct. 1837", R. Gunn 750 (2 specimens plus a colour sketch of a lip). Note: Lindley wrote "white variety" on this label.

52. (A. *C. elongata* Lindley) "Swan River, 1839", Drummond 3 specimens including one in a packet plus a colour sketch of a lip). HOLOTYPE of *C. elongata.* Note: These specimens were determined as *C. latifolia* R.Br. by George on 18/1/1968. Current opinion is that one slightly variable species occurs across the southern part of Australia.

C. longicauda Lindley

46. a) "Swan River, 1839", Drummond (2 specimens including a dissected flower in a packet and a sketch of a lip). LECTOTYPE of *C. longicauda*. Note: The lectotype was chosen by George on 5/10/1968. This material is clearly that used by Lindley when describing the species in Edward's Bot. Reg. 1-23: Swan River Appendix (1839-40). The plate accompanying the description depicts a mostly yellow flower with red glandular hairs towards the end of the segments (sepals and petals). This was described as *C. patersonii* var *longicauda* (Lindley) R. Rogers, and this has been accepted by subsequent workers, but recent revisionary studies by Hopper (pers. comm.) suggest species rank is appropriate.

46. c) "Swan River, 1839", Drummond (1 specimen). SYNTYPE of *C. longicauda.*

47. a) "Swan River, 1839", Drummond (1 specimen including 2 flowers in a packet). SYNTYPE of *C. longicauda.* Note: This specimen was designated as a syntype by George.

c) "Swan River", J. Mangles (1 specimen).

C. longiclavata E. Coleman.

46. b) (As *C. longicauda* Lindley) "Swan River, 1839", Drummond (3 specimens). Note: This specimen was determined as *C. longiclavata* by George on 5/10/1968.

C. lyallii J.D. Hook.

9. b) (As *C. angustata* Lindley) A lithograph of the species taken from Hooker's Fl. Tasman. (1855-59).

25. "Otago, New Zealand, on grassy hills, Dec. 1850" D. Lyall (1 specimen). ISOTYPE of *C. lyallii.* NOTE: the holotype is in Hooker's herbarium which is also at Kew.

C. marginata Lindley

55. (As *C. ochreata* Lindley) "Swan River, 1839", Drummond (5 specimens including one flower in a packet and a sketch of a lip). HOLOTYPE of *C. ochreata.* Note: This specimen was determined as *C. marginata* Lindley by George on 16/1/1968.

56. (As *C. alba* R.Br.?) "K.G. Sound", Collie (2 specimens and a sketch of a lip. HOLOTYPE of *C. marginata.*

C. menziesii R.Br.

29. a) A lithograph of the species taken from Hooker's Fl. Tasman. (1855-59).

b) "Tasmania", Archer (5 specimens).

30. a) (As *Leptoceras menziesii* (R.Br.) Lindley) "George Town, Van Diemensland", C. Stuart ex Herb. Plantae Muelleriana (1 specimen).

b) (As *Leptoceras menziesii* (R.Br.) Lindley) "Circular Head, Insula Van Diemen Oct.-Nov., 1837", R. Gunn 753, 348 (7 specimens including 3 flowers in a packet and a sketch of a lip). Note: These specimens were determined as *Caladenia menziesii* R.Br. by George on 9/1/1968.

31. (As *Leptoceras oblonga* Lindley) "Swan River", Capt. J. Mangles R.N. (1 specimen including a flower in a packet and a sketch of the flower). HOLOTYPE of *Leptoceras oblonga. Note: The specimen was determined as Caladenia menziesii* R.Br. by George on 9/1/1968. Lindley (1840) differentiated this plant from *C. menziesii* in the following manner: "This has the habit of *Leptoceras menziesii* but is a much larger plant, and the glands of the lip are quite different". Although the general configuration of the calli are slightly different in this specimen it is no more than a robust form of *C. menziesii.*

C. multiclavia H.G. Reichb.

34. "Swan River", Drummond 441 (5 specimens including one flower in a packet). ISOTYPE of *C. multiclavia.* Note: The lips of 3 of the 4 specimens on the sheet are missing.

C. pallida Lindley

17. "Circular Head, Insula Van Diemen. Oct.-Nov. 1837", R. Gunn 9]7 (7 specimens). HOLOTYPE of *C. pallida.* Note: The specimens have the appearance of a small pale yellow flowered form of *C. reticulata* Fitzg., with small short finely clavate petals and sepals (Fig. 3).

43. d) (As *Leptoceras* 177) "Nangus", McArthur (1 specimen).

C. patersonii R.Br.

23. b) (As *C. pulcherrima* F. Muell. ms) "Austral felix", F. Mueller (1 specimen from a mixed collection with *C. clavigera*).

37. a) (As *C. filamentosa* R.Br.) "Circular Head, Insula Van Diemen. 1837", R. Gunn 910 (5 specimens including one in a packet and a sketch of a lip).

b) (As *C. filamentosa* R.Br.) A lithograph of the species taken from Hooker's Fl. Tasman. (1855-59). Note: Lindley apparently changed his mind about the identity of these specimens and drawing as he pencilled in *"C. patersonii"* above his first determination.

43. a) "Circular Head, Insula Van Diemen. Nov. 1837", R. Gunn 909 (7 specimens including 3 dissected flowers in a packet).

c) "Van Diemensland, 1838", George Everett (1 specimen).

e) (As *C. pulcherrima* F. Muell. ms) "Van Diemensland", C. Stuart ex Plantae Muellerianae (1 specimen).

44. a) (As var. B) "Sandy Bay, Tasmania", M. Verreaux ex Herb. Mus. Paris France No 157. (1 specimen).

b) (As var.B) "Woolnorth, Insula Van Diemen., Oct. 1887", Gunn 908 (5 specimens including one in a packet and a sketch of a lip). Note: These specimens all have shorter broader segments that are darker in colour than those normally found in the species.

45. "Tasmania", Archer (6 specimens).

C. reptans Lindley

54. "Swan River, 1839", Drummond (5 specimens including a flower in a packet plus a coloured sketch of a lip). HOLOTYPE of *C. reptans.*

C. reticulata Fitzg.

43. b) (As *C. pulcherrima* F. Muell. ms) "Van Diemensland", C. Stuart ex Herb. Plantae Muellerianae (1 specimen).

C. sericea Lindley

22. "Swan River, 1839", Drummond (2 specimens), including a flower and a packet and a coloured sketch of a lip). HOLOTYPE of *C. sericea.*

C. tessellata Fitzq.

11. a) (As *C. gracilis* R.Br.?) "New Holland", Miller (1 specimen). Note: The original determination was in Hooker's hand.

b) (As *C. testacea* R.Br.) "N.S.W., 1855", W. Catlett (1 specimen).

C. testacea R.Br.

57. a) (As *Caladenia*) "New South Wales, 1855", W. Catlett 210 (4 specimens).

b) "Port Jackson, 1803", R. Brown (2 specimens and a sketch of a lip). SYNTYPE of *C. testacea.*

c) "In the vicinity of Parramatta, N.S.W. and elsewhere in barren sandy forest lands, Nov.-Dec.", A. Cunningham (1 specimen including 2 lips in a packet and a coloured sketch of a lip).

References

Blaxell, D.F. (1980). *Caladenia catenata* (Sm.) Druce : A Taxonomic Note. *The Orchadian* 6(8):180.

Clemesha, S.C. (1967). A new name for a Western Australian *Caladenia. The Orchadian* 2(9):118.

Clements, M.A. (1982). Preliminary checklist of Australian Orchidaceae. National Botanic Gardens, Canberra, Australia.

Clements, M.A. (1983). Notes on the contents of John Lindley's orchid herbarium — 1: *Acianthus. The Orchadian* 7(10):241-242.

Curtis, W.M. (1979). The Student's Flora of Tasmania. Part 4A. Angiospermae: Orchidaceae. Govt. Print. Hobart.

George, A.S. (1971). A checklist of the Orchidaceae of Western Australia. *Nuytsia* 1(2):166-196.

Halle, N. (1977). Flore de la Nouvelle-Caledonie et Dependances 8. Orchidacees. Paris.

Lindley, J. (1840). The Genera and Species of Orchidaceous Plants. Part VI. Arethuseae. Ridgways, Piccadilly, London.

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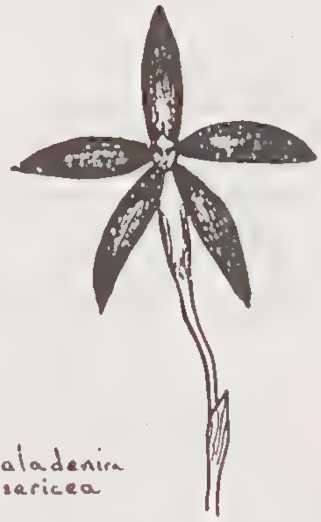
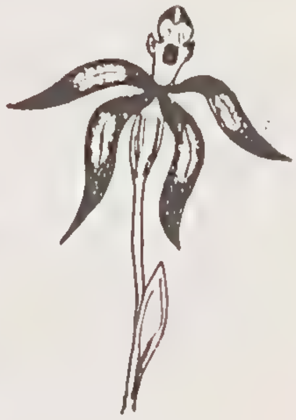


Caladenia sericea



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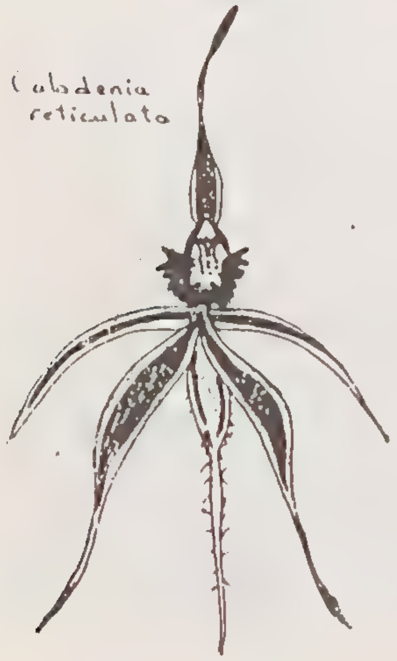

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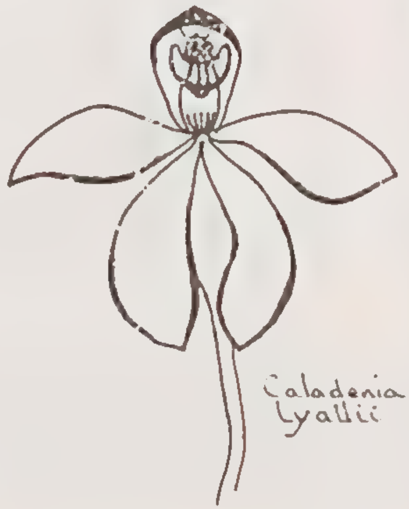
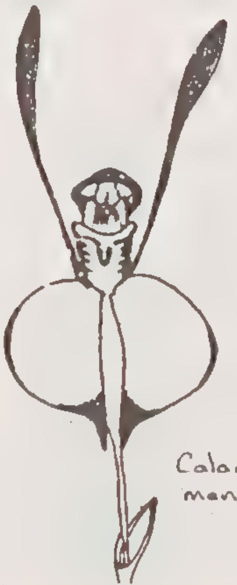


Caladenia Lyallii



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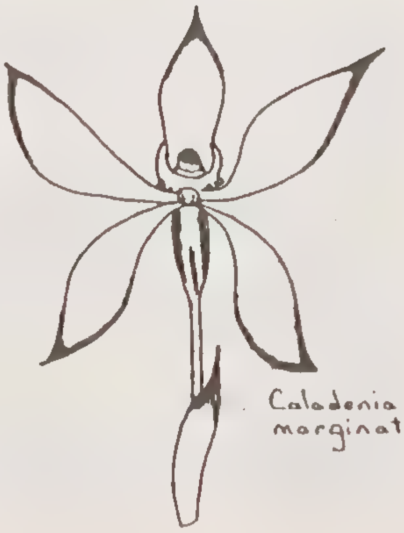

Caladenia marginata

Drawings by M Penberthy after Woolcock

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CONSERVATION

Protection Achieved

by Gerry Walsh

In the Orchadian of June, 1984, there appeared an article entitled "Protection At Last?". It was, in essence, a report on a meeting held in September 1983 between representatives of the National Parks and Wildlife Service of New South Wales and A.N.O.S. Council (and myself as a member of A.N.O.S.). The discussion revolved around the possibility of protecting certain species of native orchids that the majority of A.N.O.S. members considered to be in danger of disappearing from the wilds of New South Wales. A paper was tabled that described the status and distribution of various species. Group One in that paper mentioned four species: *Dendrobium falcorostrum; Sarcochilus hartmannii; S. fitzgeraldii* and *S. ceciliae;* as being particularly vulnerable to over-collection. Whilst it was agreed that the hobbyist must accept some of the blame for this situation, it was agreed by those present (see June Orchadian) that licensed commercial pickers are the main offenders for the exploitation and subsequent decline of wild stocks. This of course is not a view shared by everyone. Perhaps some discerners (of which there are a few about) would be willing to inform us of the other side of the story so that we can all gain a complete understanding of this most urgent subject. It is only by presenting **all** the arguments that we will ever learn.

A recommendation was put forward that Group One species be no longer allowed to be picked, and that in the future, no new licenses be approved, nor any old licenses renewed, on which those species are listed. It now gives me great pleasure to report that the four species concerned now enjoy full protection from commercial picking. Reproduced below is the text from the official memorandum that has been sent to the three regional offices of the N.P.W.S. concerned; Port Macquarie, Dorrigo and Grafton.

ENDANGERED ORCHIDS IN NORTHERN N.S.W.

I have been approached by Australasian Native Orchid Society regarding the status of several species of orchid that are causing them some concern.

These are:—

Dendrobium falcorostrum
Sarcochilus fitzgeraldii
Sarcochilus hartmannii
Sarcochilus ceciliae

I would appreciate each district perusing their plant licences and give me a summary of licences to pick these particular species.

Further, I would like all districts to also give me a summary of licences containing those species referred to in Nature Conservation Paper No. 36 (Rare and Threatened Plant Species) with particular attention to Appendix XVI.

Until this can be reviewed with an aim to legislative change, I would ask districts to discourage pickers from these species and not to issue any licences for them.

Signed.
T. Alexander, Law Enforcement Officer,
Northern Region.

Several people have asked why these four species were singled out for special attention when there are so many other species in N.S.W. are eligible for protection. The answer is quite simple, *D. falcorostrum, S. hartmannii, S. fitzgeraldii* and *S. ceciliae* are all relatively uncommon compared to many other species.

1.) They are showy and colourful and therefore 'saleable'. Their horticultural attractiveness contributes to their own demise. Other species also exhibit similar public appeal but do not, as yet, suffer from the same degree of rarity.

2.) The four species we are concerned with here can all be pinned down to very definite geographical and geological habitats. Altitude and rock faces for example. This made them very easy to group together and enabled them to be defined on paper without the need to write volumes about their individual requirements.

Now that protection has finally been afforded to some of our native orchids, I sincerely hope that the days are now gone when national gardening magazines carry advertisements for nursery operators offering *S. hartmannii* for sale announcing that "it is now available in unlimited quantities". Believe it or not, this is exactly what has been happening of late.

In the past it has been claimed that Antarctic Beech forests are to be logged, which they haven't been for a generation. Landholders have proclaimed that they intend ploughing up cliffs to plant crops, which they never do. The National Parks and Wildlife Service has always stated that they intend doing something positive about native orchids 'soon'. Finally, they really **have** achieved something of immense value to this State, with a little bit of pushing from A.N.O.S. Mr T. Alexander and his Department are to be heartily applauded for 'biting the bullet' and listening to the appeals of those that are concerned.

Gerry Walsh
7 Leslie Court,
Werrington 2760.

Who's Who

A Directory to the Australasian Native Orchid Society —Its Officers and Group Contacts

ANOS Executive Council (Address as shown on Editorial page)

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- **Port Hacking Group** — Tel: (02) 524 9996. Meets 8 p.m. 4th Tuesday each month at Community Hall, Gymea Bay Road, Gymea.
- **Sydney group** — Tel: 635 8769 (Neil Finch). Meets 8 p.m. 3rd Friday each month at Lady Game Community Centre, Moore Avenue and Bradfield Road, West Lindfield.
- **Warringah Group**— Tel: (02) 99 2468. Meets 8 p.m. 2nd Thursday each month at Thomas Vickers Memorial Hall, Cnr. Pitt and Grainger Roads, North Curl.
- **Wollongong & District** — Tel: (042) 564 228. Meets 2nd Tuesday each month in Meeting Room Wollongong Town Hall.
- **Central Coast Group** — Tel: (043) 88 1785. Meets 8 p.m. 2nd Wednesday each month at Baptist Church Hall, York & Frederick Streets, East Gosford.
- **Newcastle Group** — Tel: (049) 43 0882. Meets 8 p.m. 4th Wednesday each month at John Young Community Centre, Thomas Street, Cardiff.
- **Far North Coast Group** — Tel: (066) 24 1023. Meets 1st Thursday each month at Ballina High School, Burnett Street, Ballina.

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- **Victorian Group** — Tel: (03) 850 8624. Meets 8 p.m. 1st Friday each month at the National Herbarium, Royal Botanic Gardens, Melbourne.

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- **Bass Group** — Tel: (004) 29 3198. Meets 8 p.m. last Thursday each 2nd month at Ulverstone High School, Walker Street, Ulverstone.

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- **Darling Downs Group** — Tel: (076) 35 8627. Meets 7.30 p.m. 3rd Friday each month at Technical and Further Education Centre, Old Empire Theatre, Neil Street, Toowoomba.
- **Native Orchid Soc. of Queensland (Associated)** — c/o P.O. Box 159, Broadway Queensland,4000. Meets 8 p.m. 1st Friday of each month at Bread House, 49 Gregory Terrace, Brisbane.

SOUTH AUSTRALIA

- **Native Orchid Society of South Australia (Associated)** — Tel: (08) 278 2917. Meets 4th Tuesday each month at St. Matthew's Hall, 67 Bridge Street, Kensington.

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- **W.A. Native Orchid Study & Conversation Group (Inc.) (Associated)** — Tel: (09) 398 3578. Meets 3rd Wednesday each month at Kings Park Board Admin. Centre Theatrette, Frazer Road, Kings Park, West Perth.

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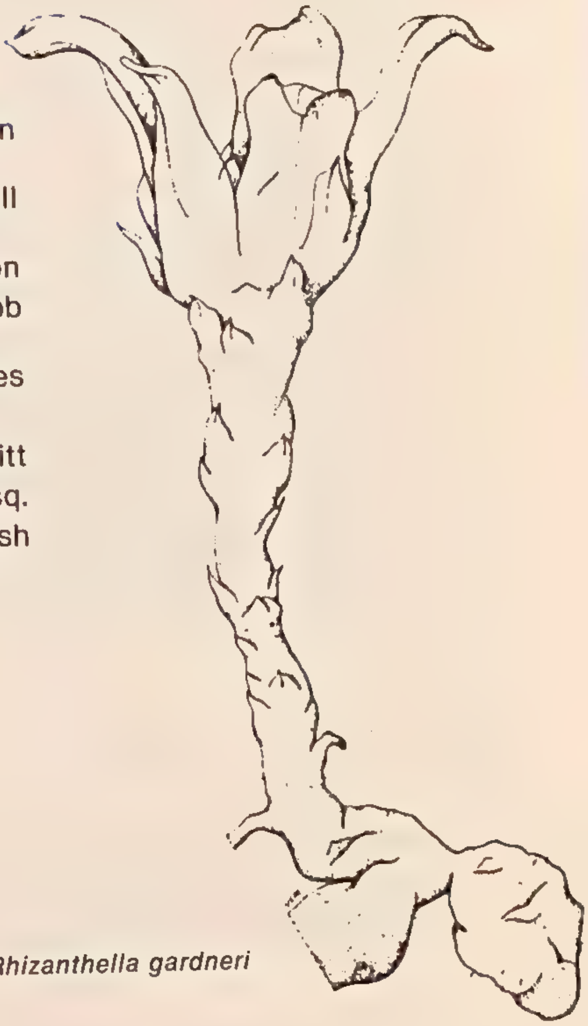
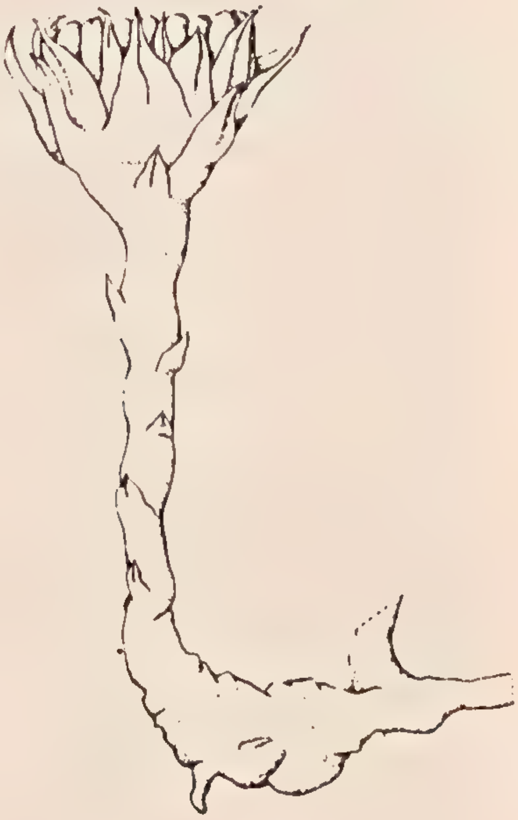


Rhizanthella gardneri



Rhizanthella slateri

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Notice of ANOS Annual General Meeting

Members are advised that the 22nd Annual General Meeting of the Australasian Native-Orchid Society will be held on Saturday, 17 August 1985 at 10 a.m. in the Maiden Theatre, Royal Botanic Gardens, Sydney. (Entry via Mrs Macquarie's Road is suggested.)

Members may vote by being present at the meeting or by completing a proxy form and lodging it with the Hon. Secretary not less than 48 hours before the meeting.

A meeting of Delegates from ANOS Groups and affiliated native orchid societies, comprising the ANOS Advisory Committee, will commence at 1.30 p.m. on that day at the same venue.

M. Harrison
Hon. Secretary

GENETIC SYSTEMS OF AUSTRALIAN TERRESTRIAL ORCHIDS PAST, PRESENT AND FUTURE RESEARCH

A Letter from Rod Peakall
Post Graduate Student
Department of Botany
University of Western Australia

During 1984 I was involved in an Honours Research project which investigated various aspects of the genetic systems of Western Australian Orchids. Results of the project are presented in my Thesis entitled Preliminary Investigations into the Genetic Systems of Western Australian Orchids.

During the next 3 years I will be involved in continuing research on various aspects of the genetic systems of Australian terrestrial orchids as a Ph.D. research project. I am hoping there will be some keen enthusiasts who will be willing to contribute towards the success of this project. In the short term I would be interested in hearing from anyone who observes the pollination of *Leporella fimbriata* in the coming season. It would be even more useful if the pollinators were captured and sent to me for identification. Pollinators are best preserved in a small jar containing 70% ethanol and 3% glycerol. Please provide complete details of your observations, location, etc.

I would also be grateful for tubers of eastern states terrestrials especially those species which produce active root systems. I will be primarily utilizing this material for chromosome counts which is often destructive of the tuber. I would especially appreciate tubers of all eastern *Cryptostylis* species. The chromosome count for the West Australian *Cryptostylis ovata* is exceedingly high and therefore an investigation of the chromosome number in eastern states species promises to be worthwhile.

I will also be attempting to asymbiotically germinate orchid seed and consequently seed from any species would also be gratefully received. Please ensure that all material is clearly labelled with complete species name, location, collector and other relevant information.

I regret that at this stage I am unable to reciprocate tubers or seeds. However, I will be happy to provide detailed information of results and reprints of publications when they become available.

Looking forward to corresponding with many of you, and thanking readers.

Rod Peakall

The Underground Orchids of Australia — an appraisal

by Dr Kingsley W. Dixon

A recent study (Clements and Cribb, 1984*) has reduced the eastern Australia monotypic genus of underground orchid, *Cryptanthemis*, to synonomy with *Rhizanthella*, the (monotypic) Western Australian underground orchid.

This article examines the proposed merger of the two genera, highlighting an additional suite of "characters" and proposed "characters" considered important, the latter requiring examination, *in situ*, of extant, living, material of *Cryptanthemis slateri*. Problems associated with character uniformity which are encountered in many geophilous and achlorophyllous flowering plants are also addressed.

Rhizanthella gardneri R.S. Rogers, Journ. Roy Soc. W. Austral. 15 : 1-7.

After eluding botanists and amateurs for 20 years the rediscovery in 1979 of the Western Australian underground orchid provided an opportunity for fresh reassesment of this orchid's morphology, phenology and reproductive biology.

Following the rediscovery, research has continued till the present with generous funding of personnel of the University of Western Australia provided by World Wildlife Fund Australia and the Australian Orchid Foundation. As a result of these studies many baffling aspects of this rare orchid's morphology, phenology and reproductive biology have been resolved.

However, numerous gaps still exist in our knowledge of the orchid's behaviour, even after 4 years of research. For example, where and how is the supply of nourishment to this achlorophyllous species maintained — is it from its close plant-associate, *Melaleuca uncinata* (broom honeymyrtle) or other subsidiary species? What disperses the seed and how do seedlings establish in the wild? What environmental component triggers floral development instead of continued vegetative growth? And even after years of searching and a total of 5 extant locations for the orchid, we are still uncertain as to its natural abundance and distribution range. The latter may always remain an enigma because of the sporadic and totally subterranean growth and flowering habits of *Rhizanthella gardneri*. It is difficult, if not impossible to declare an area devoid of the underground orchid unless the entire soil profile down to 12cm is examined.

Continued research using habitat observations and seed grown plants will resolve many of these remaining questions. However, historical and current clearing of potential bushland habits in the "home" of *R. gardneri* (the wheatbelt of WA) is exacerbating an already critical shortage of pristine habitats suitable for research and conservation of the species. Certainly if marsupials are involved in seed dispersal (George, 1980) the size of reserves in the southern wheatbelt which contain the bulk of the *R. gardneri* plant resource would be inadequate for preservation of a sizeable small mammal population. Surveys of two *R. gardneri* locations confirm the extensive depletion of small mammal species from these areas (Dixon, 1982) hampering research of potential seed dispersal agents.

Cryptanthemis slateri Rupp, Proc. Linn. Soc. N.S. Wales 52 : 58 (1982)

Cryptanthemis slateri has not been professionally examined *in situ* since Rev. Montagu Rupp and Dr H.L. Kesteven uncovered 12 specimens on the slopes of Alum Mt, Buladelah, NSW. All later discoveries (Kerr, 1981) were accidental and contributed little to information on *in situ* biology. Hence the entire biological knowledge of this orchid is confined to herbarium voucher specimens and notes and photographs accompanying the 1930's discoveries. The WA underground orchid on the other hand is comparatively well known and is represented by an apparent plethora of scientific and popular articles.

History of Discoveries

Comprehensive accounts of the discovery and history of finds of *R. gardneri* are contained in Rogers (1929), George (1980), Dixon (1983) and Dixon and Pate (1984). A chronology of discovery and research of *R. gardneri* is outlined in table 1.

Following the 1929 discovery by farmer John Trott, *R. gardneri* was collected another four times over the next 30 years. All these finds occurred within 100km of the Corrigin type location, the last of these in 1959 during a scrub clearing operation near the small wheat siding town of Babakin. All finds of the orchid were in close association with the broom honeymyrtle shrub (*Melaleuca uncinata*) a species now exploited for brushwood fencing in many other Australian states.

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*This article is reprinted in this issue, Ed.

Table 1: History of discoveries of *Rhizanthella gardneri* in Western Australia

Date	Month	Site of Discovery	Method of Discovery	Collected or sighted
1914		Wubin — no specimen (North Wheatbelt)	A	?
1928	May	Corrigin	A	4 (inc. type)
1928	June	Goomalling	A	? (1)
1928	June	Shackleton	A	?
1938	June	Moonigin (Central Wheatbelt)	A	1
1938	Aug	Corrigin	A	1
1940	?	Corrigin	A	?
1959	May	Babakin	A	1
UP TO 1960 7 (8) SPECIMENS AT 5 LOCALITIES				
1968		$100 Reward offered by John Trott		
1978	**SEPT**	**PROJECT TO RESEARCH *RHIZANTHELLA* SUPPORTED BY WWF**		
1979	May	Munglinup (South Coast)	A(DCR)	11
1980	May	Munglinup	D (R)	15
1980	May	Babakin	D	1
1981	**JAN**	**PROJECT WITH WWF STARTED**		
1981	Jan-Aug	Babakin	D	38
1981	June	Sorenson Reserve (Central Wheatbelt)	D	2
1981	Jul-Oct	Cheadanup (South Coast)	D	6
1981	Aug-Sep	Oldfield Location	D	5
1982	May-June	Babakin	D (R)	110
1982	May	Sorenson Reserve	D (R)	4
1982	June	Oldfield Location	D (R)	4
1982	Aug	Cheadanup	D (R)	4

AV. MAN HOUR EFFORT/FIND (1979-1982): 9 HOURS

A — accidental usually during clearing operations
D — deliberate searching of new location
DCR — deliberate searching of confirmed site

From 1979 on, over 150 plants have been discovered in 5 sites, two in the wheatbelt proper the remaining three, including the Munglinup rediscovery site, some 400km to the southeast. All locations show remarkable consistency in soil and vegetation types prefered by the orchid. Differences in floral morphology between wheatbelt and (Corrigin) southcoast (Munglinup) plants suggest the existence of two ecotypical races for the orchid (Dixon and Pate, in press). This correlates with the distribution of broom honeymyrtle thicket/Eucalypt shrubland which is the favoured vegetation type for *R. gardneri* Fig a. (see also Dixon & Pate (1984)).

The eastern underground orchid was first collected by Mr Edwin Slater in 1931 on the western slopes of Alum Mt. Unlike the early collections of the WA underground orchid, *Cryptanthemis slateri* was collected over a wide geographical and edaphic range; from northern NSW to the Blue Mountains at Springwood (1974) and Wentworth Falls (1975). Altogether 14 specimens have been retrieved from 4 locations. A possible fifth location is represented only by a colour photographic record (Australian Orchid Review, June, 1981). The discoverer and precise location remain a mystery.

Thus, compared to the known plant resource of *R. gardneri* the eastern underground orchid represents a species both poorly collected and presumably rare and little known biologically. Details of *in situ* features of the eastern underground orchid such as "rhizome" morphology and anatomy, mycorrhizal associates, pollination vector(s) and reproductive biology are obscure and await rediscovery of the species.

Reasonable discussion of the taxonomic status of the two genera would at present, represent a study greatly disadvantaged by the paucity of accurate *in situ* information for *Cryptanthemis slateri* the most recent being the observations of Rupp and Kesteven in 1933. On the other hand, regular visits to *Rhizanthella* sites is an easy matter and flowering plants are readily observed in a natural setting. As found with *R. gardneri* the 20 year gap in discoveries from 1959 till 1979 was sufficient for the growth of all manner of misconceptions regarding the orchids growth and flowering habits.

Fortunately it happens that *R. gardneri* is amenable to cultivation and will flower from seed within 18 months of sowing (Warcup, pers comm.). This facility will provide a wealth of information hitherto difficult to obtain under natural conditions. Presumably *C. slateri* could be similarly treated.

Table 2 outlines additions and reappraisals of characters considered by Clements and Cribb in their recent paper. Details for *Cryptanthemis* have been gleaned from published works and from site visits to the Buladelah location, see Fig b. During my visits to Alum Mt I was indeed fortunate to be accompanied by Mr Edwin Slater who was able to pinpoint the spot where the first *Cryptanthemis* plants were uncovered. Mr Slater's impressions of the plant greatly aided our understanding of the local abundance, distribution and biology of *Cryptanthemis,* relevant details of which are included in Table 2. Follow up searches of Alum Mt in 1983 and October 1984 have failed to locate specimens of *C. slateri.*

Taxonomic Status of *Rhizanthella* and *Cryptanthemis*

Since many achlorophyllous, terrestrial and subterranean species have undergone substantial reduction in overall plant form it would appear necessary that in arriving at taxonomic decisions consideration should be given to a diagnosis of ALL plant parts, both macroscopic and microscopic and, indeed, certain plant functions (eg. mycorrhizal associates, pollinators etc.). Taxonomy of chlorophyllous angiosperms invariably considers many aspects of plant vegetative form extending to all manner of morphological and anatomical characters.

Special attention need also be paid to the taxonomic problems associated with the high degree of floral and vegetative convergency and parallelism in characters associated with subterranean or geophilous flowering plants. Vogel (1978i, ii) highlighted the degree of parallelism possible. when by comparing characters of geophilous species he predicted the form of the flowers and inflorescence of *R. gardneri* without having prior knowledge of the genus. Similarly, descriptions of plant behaviour in other achlorophyllous Orchidaceae are remarkably akin to observations for *R. gardneri* (and *C. slateri*) (Campbell, 1970). Dressler (1981) on convergence in orchids comments "Convergence to a similar habitat or lifestyle has led to parallelism in several different features. In the extreme case this can lead to remarkably similar organisms that are only distantly related to each other .... Once we know enough of pollen structure, anatomy, chromosome number and embryology .... [of orchids] the problem should vanish". He goes on to say "Saprophytism crops up repeatedly [in the Orchidaceae], but this is scarcely surprising since all orchids go through a saprophytic stage [as achlorophyllous protocorm bodies often buried in the surface soil]".

Fig a. Broom bush habitat for *Rhizanthella*. Compare to forest habitat for *Cryptanthemis*.

It is therefore considered premature for a definitive and final resolution of the status of these two genera given

(a) the paucity of knowledge surrounding the vegetative and reproductive biology of *Cryptanthemis*

(b) the possibility that a high degree of parallelism may be present in the genera

(c) significant differences in habitat preferences and other characters (table 1)

A dossier of information for *Cryptanthemis slateri* similar to that assembled for *Rhizanthella gardneri* (Dixon and Pate, in press) would therefore be a necessary prerequisite in future taxonomic considerations, in addition to providing a realistic assessment of the conservation status of a potentially endangered orchid species.

Table 2. Comparison of habitat preferences, morphological and floral characters of *Cryptanthemis slateri* (eastern underground orchid) and *Rhizanthella gardneri* (western underground orchid).

HABITAT **PARAMETERS**	***Cryptanthemis* (Buladelah Location 1)**	***Rhizanthella* (All Locations 2)**
Rainfall	1300mm summer and winter	300-500mm mainly winter
Soil	heavy loamy-clay; podzolic, slightly acid. 25-30% organic matter	sandy-clay to sandy loam over white clay; podzolic 1-3% organic matter
Litter Layer	10-15mm	nil-1mm
Overstorey	mature forest, canopy cover 70-70%, height 20m, Dominants: forest blackbutt (*Eucalyptus pilularis*) Sydney peppermint (*E. piperata*) Smooth-barked apple (*Angophora costata*)	shrubland, occasional emergent mallee to 2m, Dominants: broom honeymyrtle (*Melaleuca uncinata*) *E. cylindiflora*
Understorey	Sparse to medium density height 3m Dominants: forest oak (*Casuarina torulosa*)	sparse to absent.
Herb Layer	Medium density, Dominants: bracken fern; (*Pteridium esculentum*) blady grass	Sparse, Dominants: scattered Restionaceae; *Borya nitida*
Orchid Cohorts	*Dipodium punctatum* (achlorophyllous) *Pterostylis* spp. Lithophytic and epiphytic species, *Dendrobium kingianum, D. speciosum, D. delicatum, D. linguiforme*	Scattered *Pterostylis* spp; *Caladenia* spp.
PLANT CHARACTERS (additional to Clements and Cribb, 1984)		
Storage Organ	Rhizome elongated, multibranched, continuous; vegetative reproduction by separation of lateral rhizome from parent rhizome.	A tuber, globular-cylindrical; daughter tubers produced annually on subterminal axillary branches. Often stalked and depth-seeking.
Storage Organ Longevity	Rhizome perennial; seasonal additions (?)	tuber segment replaced annually
Involucre of Bracts	Not exceeding flowers; capitulum unprotected	greatly exceeding flowers; capitulum fully enclosed in conical protective dome of bracts.
Bract Movements	Nil after exposing capitulum	After excavation reflex rapidly to expose flowers
Bract Venation	All bracts one veined	Small bracts 3-veined; large inner bracts with 3-7 simple or bifurcate veins
Capitulum Position in Soil	Soil surface or litter layer (E. slater, pers comm.)	buried 1-1.5cm in soil
Floral Parts	tepals essentially free	tepals fused ½ to ¾ their length, anterior margins of

		lateral lobes prominently flared forming a sinus at their base.
Ovary	"irregularly quadrilateral"	elongated, globular, twice as long as undeveloped ovaries.
Capsule	swollen, succulent, probably indehiscent	indehiscent, succulent; sepaline sinus v. prominent.
Seed	(?)	150-250 per capsule; prominent spiral striations; 0.5mm long; globular with circular prominence at placental end.
Labellum Sensitivity	mobile, irritable (?)	irritable once or twice; otherwise mobile.
Pollinator(s)	(?)	flys, wasps, termites
Seed Dispersal Mechanism	elongation of peduncle; rain splash (?)	seed development *in situ*; marsupials (?), termites (?)
Mycorrhizal Associates	(?)	symbiont, *Thanatephorus cucumeris* possible epiparasitism on *M. uncinata.*

1 Data relevant only to Buladelah location.
2 Data representative of all extant locations.

Fig b. Buladelah type location of *Cryptanthemis,* pinpointed by Edwin Slater, collector of first specimen.

References:

Campbell, E.O. (1970) The fungal association of *Yoania australis.* Trans. R. Soc. N.Z., Biol. Sci., 12(2) : 5-11.

Clements, M. and Cribb, P. (1984). The underground orchids of Australia. Kew Magazine 11(2) - : 84-91.

Dixon, K.W. (1982) Biology and Status of *Rhizanthella gardneri* Rogers (Orchidaceae), the Western Australian underground orchid. Unpublished report to World Wildlife Fund Australia. 63 pages.

Dixon, W.W. and Pate, J.S. (1984). Biology and distributional status of Rhizanthella gardneri Rogers. The Western Australian Underground Orchid. Kings Park Research Notes **9.** 54pp. Kings Park Board, West Perth 6005.

Dixon, K.W. and Pate, J.S. (in press). Subterranean Orchids. In Arditti, J. (editor), "Orchid Biology, Reviews and Perspectives III." Cornell University Press.

George, A.S. (1980) *Rhizanthella gardneri* R.S. Rogers — the underground orchid of Western Australia. Amer. Orchid Society Bull. 49, 6 : 631-646.

Kerr, R. (1981) Have you seen *Cryptanthemis slateri* lately? Australian Orchid Review 46 (2) : 88-91.

Rupp, H.M.R. (1932) Notes on New South Wales orchids, I and II. Proc. Linn. Soc. N.S. Wales 57 : 58.

Rupp, H.M.R. (1984) The habitat, character and floral structure of *Cryptanthemis slateri* Rupp (Orchidaceae). Proc. Linn. Soc. N.S. Wales 59 : 118-122.

Vogel (1987i) Fungus gnat flowers mimicking fungi — Part 1. Flora (Jena). 167 (3-4) : 329-366.

Vogel (1978i) Fungus gnat flowers mimicking fungi — continuation and conclusion. Flora (Jena) 167 (5) : 367-398.

Kings Park and Botanic Gardens
West Perth 6005

Notes on the genus *Malaxis* Sol. ex Sw., including a new record for Australia

by K.D. Hill & D.F. Blaxell

Malaxis Sol. ex Sw., Prodr. Veg. Ind. Occ., 119 (1778).

Type species: *Malaxis spicata* Sw.
(Lectotype designated by Britton & Brown, 1913.)

The genus *Malaxis* Sol. ex Sw. currently includes approximately 300 species, and has an almost cosmopolitan distribution (excluding New Zealand). Greatly different plant forms are presently included in the genus, together with large numbers of endemic species in adjacent floristically similar areas, suggesting that the genus urgently requires critical study.

Ridley (1888) divided the genus (as *Microstylis*) into 9 sections, 6 endemic to the Americas, one African and two Asian; and retained *Malaxis* as a genus for the solitary European species. Schlechter (1911) then divided the New Guinea species (again as *Microstylis*) into 7 sections, based largely on labellum characters.

Seidenfaden (1978) accepted 5 of Schlechter's sections (with minor nomenclatural adjustment) for the Thai species and created one additional section. He included Schlechter's section *Hololobus* (which includes *M. acuminata*) in section Malaxis, which is now lectotypified on the New World species *M. spicata* Sw. However, the New World sections of *Malaxis* achieve the 'labellum uppermost' floral orientation by hyper-resupination (twisting of the ovary through 360°, i.e. 180° beyond normal resupination), whereas the Asian *Malaxis* achieve the same floral orientation through non-resupination. This difference has significant evolutionary implications, and is in fact sufficient basis for segregating at least the two groups as genera.

Section *Hololobus* Schltr. is hence here reinstated for the appropriate Asiatic species, leaving American species only in section *Malaxis*. The Asiatic species will probably be placed in a separate genus when a full study can be made.

Section *Hololobus* (Schltr.) K. Hill & D. Blaxell, comb. nov. Plants erect. Flowers hyper-resupinate. Lip 3-lobed, with auricles stretching behind column, midlobe entire or bifid.

***Basionym: Microstylis* Sect. *Hololobus* Schltr., Feddes Repert. Beih. 1, 124 (1911).**

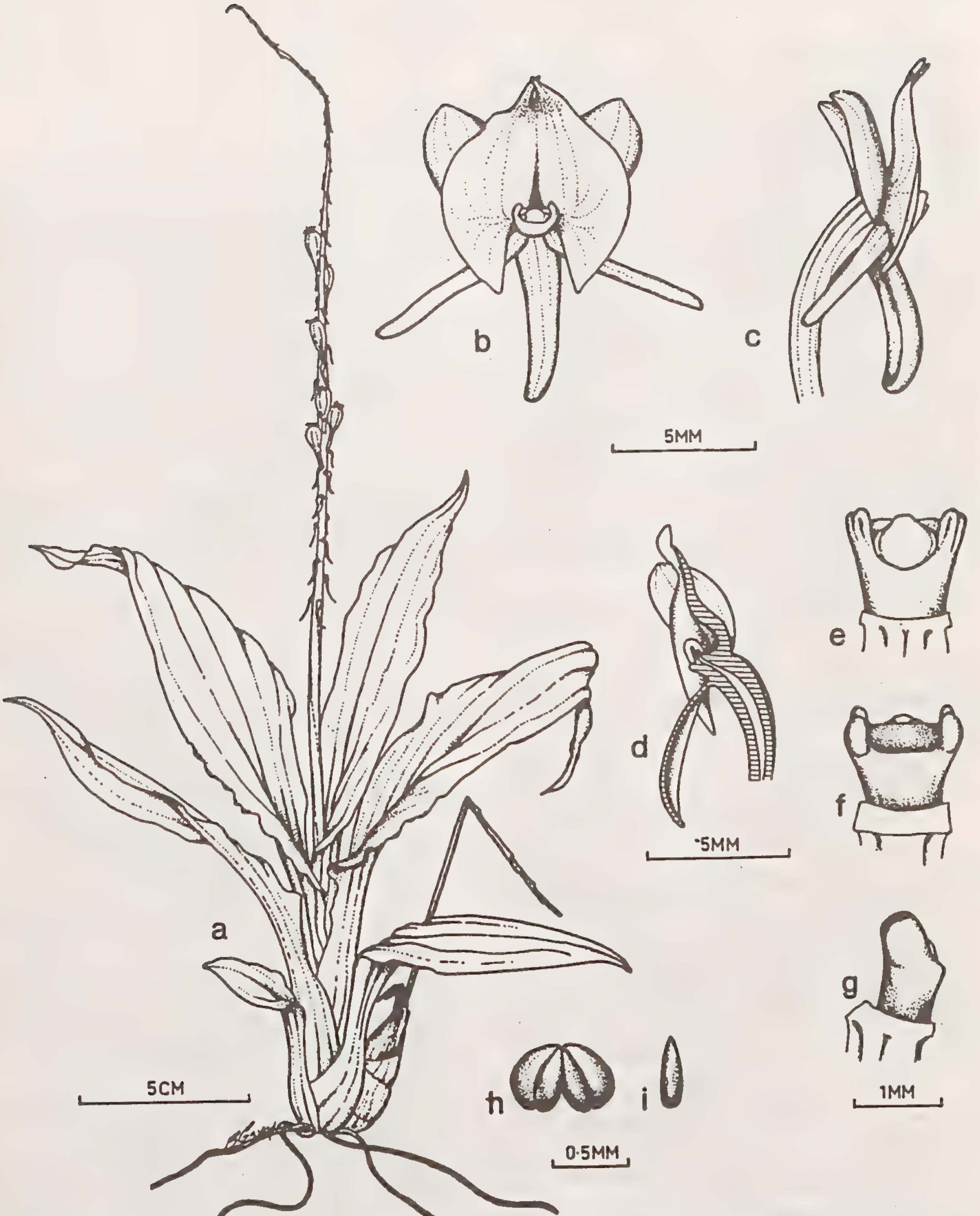
***Type species: Microstylis nitida* Schltr.**

Malaxis acuminata D. Don, Prodr. Fl. Nepal., 29 (1825).

Syn *Microstylis wallichii* Lindl., Gen. & Sp. Orch., 20 (1830).
Microstylis biloba Lindl., Gen. & Sp. Orch., 20 (1830).
Dienia carinata Reichb. f., Bonplandia 3, 223 (1855).
Microstylis pierrei Finet, Bull. Soc. Bot. Fr. 54, 535 (1912).
Microstylis trigonocardia Schltr., Feddes Repert. Beih. 4, 62 (1919).
Microstylis siamensis Rolfe ex Downie, Kew Bull., 368 (1929).

Terrestrial herb, 10-15cm high. Rhizome short; stems (pseudobulbs) closely packed, conical, 4-7cm high, 1.0-2.3cm in diameter. Leaves oblique, ovate-acuminate, 5-7-nerved; lamina 7-15cm long, 3-5cm wide; petiole 2-3cm long, continuous with lamina. Inflorescence 12-20cm high; peduncle winged, about ½ length of inflorescence; 10-c. 50 flowers loosely arranged on rachis. Floral bracts narrowly triangular, deflexed, 3-5mm long. Flowers non-resupinate, opening green, ageing yellow-green, segments arranged flat in plane of labellum. Dorsal sepal oblong, 5-6mm long, c. 2mm wide, edges recurved. Lateral sepals ovate, obtuse or rounded, oblique 5-6mm long, 3mm wide. Petals linear, 5-6mm long, 1.0-1.5mm wide, edges strongly recurved. Labellum 3-lobed, elliptical, sagittate, c. 8-10mm long, 7-8mm wide; side lobes broadly triangular, entire, c. 3mm long, 3mm wide; midlobe broadly triangular, c. 3mm long, 3mm wide, apically bifid to a depth of c. 1.5mm, laterally shallowly notched on either margin; nectary c. 1.5mm long, 0.5mm wide, deeply sunken, surrounded by an arched, papillose thickening which is ± continuous with labellum. Labellum partly adnate to column. Column c. 1.5mm long, 1.5mm wide apically, green, straight; broad obtuse column-wings projecting slightly beyond anther; anther broad, shallow. Pollinia oval, yellow, 4 in 2 pairs, joined directly to small retinaculum. Stigma shallow, oval. Ovary winged, c. 3mm long.

Distinguished in the Section *Hololobus* by the broadly elliptical labellum with short, broadly triangular sidelobes, the deeply bifid



Drawing by Bruce Gray

Fig 1. — *Malaxis acuminata* D. Don, a. Habit b. Flower, front c. Flower, side d. Flower, cross-section e. column, dorsal view f. column, ventral view g. column, side h. Pollinia, front i. Pollinium, side.

midlobe with small lateral notches and the small, triangular, deeply sunken nectary; and the relatively large, green flower.

Distribution and Ecology

M. acuminata has, to date, been recorded from three localities in the Northern Territory, these being Black Jungle Swamp near Lambells Lagoon, the upper Hayward Creek area, and Bathurst Island (see specimen citations). It is not common in any place, and may be extinct at the Hayward Creek locality following a severe fire through a normally unburnt area shortly after the collection was made. This orchid usually grows in litter accumulations in areas slightly above semi-permanent standing water in heavy shade in dense closed forest pockets on humus-enriched sandy soil. These forest areas are usually in small, spring-watered pockets in low savannah woodland, and often include a number of rainforest and *Melaleuca* species. Such forest pockets are not uncommon in the more northern parts of the Northern Territory, and it is considered probable that *M. acuminata* will be located in other areas in time. This species is also recorded from Nepal, India, Indochina, China, Sumatra, Java and the Philippines.

Flowering time appears to coincide with the tropical monsoon season, December to March, although flowers examined were from cultivated plants.

Key to the species in Australia

1) Mid-lobe of labellum with 4 teeth or more .... 2.
    2) Plant erect .... 3.
        3) Inflorescence few-flowered (10 or less). — *M. lawleri* Lavarack & B. Gray (Sect. *Crepidium*)
        3a) Inflorescence many-flowered (more than 10). — *M. xanthochila* Schltr. (Sect. *Crepidium*).
    2a) Plant procumbent, — *M. fimbriata* Lavarack (Sect. *Commelinoides*).
1a) Mid-lobe of labellum with fewer than 4 teeth .... 4.
    4) Mid-lobe entire — *M. marsupichila* W.T. Upton (Sect. *Hololobus*).
    4a) Mid-lobe two or three-lobed
        5) Mid-lobe bilobed. — *M. acuminata* D. Don (Sect. *Hololobus*)
        5a) Mid-lobe trilobed — *M. latifolia* Sm. (Sect. *Gastroglottis*).

Specimens Examined:

Australia: Black Jungle Swamp, near Lambells Lagoon, N.T., D.F. Blaxell 1827 (NSW); loc. cit., G. Wightman 1157 (BRI, CANB, DNA, K, MEL, NSW); Upper Hayward Creek area, N.T., K. Hill 81 (K, NSW); Aspley Straight, Bathurst Island, N.T., G. Wightman 934 & C. Dunlop (DNA) (without flowers). **India:** Berenag, Almora District, R.N. Parker (NSW). **Phillipines:** Lamao River, Mt Mariveles, Batan Province, Luzon, Ahern's collector, For.-Bur. 1468 (NSW); Rizal Province, Luzon, Ahern's Collector, 8.1905 (NSW).

Discussion

Seidenfaden distinguishes *M. acuminata* from *M. purpurea* (Lindl.) Kze. on the basis of indentations separating the mid-lobe and side-lobes of the labellum in the latter, absent from the former. The specimens from the Northern Territory display both conditions (presence or absence of indentations) on the same inflorescence. The Australian species, however, matches *M. acuminata* in other respects (colour of flower and overall labellum shape). *M. acuminata* is a widespread and variable species, and may include *M. purpurea*, although further study is required here.

Acknowledgements

We wish to thank Mr Peter Hind, who has maintained the plant (KH81) in cultivation and supplied material for study and permanent records; and Mr Bruce Gray for the excellent illustration.

References

Backer, C.A., and R.C. Bakhuizen van den Brink. "Flora of Java-3" Walters-Noordhoff N.V., Groningen, 1968.

Britton, N.L., and A. Brown. "Illustrated Flora of N. United States and Canada." Vol. 1, Ed. 2, 517. New York. 1913.

Halle, N. "Flore de la Nouvelle — Caledonie et Dependencies. 8 Orchidacees." Museum National d'Histoire Naturelle, Paris. 1977.

Holttum, R. "A Revised Flora of Malaya. Vol. 1, Orchids". Govt. Printer, Singapore. 1953.

King G. and R. Pantling. "The Orchids of the Sikkim-Himalaya" Bengal Secretariat Press, Calcutta. 1898.

Oakes-Ames, A.M. "Studies in the family Orchidaceae — 2". Riverside Press, Cambridge, Mass. 1908.

Ridley, H.N. A revision of the genera *Microstylis* and *Malaxis*. J. Linn. Soc., Bot. 24, 308-357 (1888).

Schlechter, R.R.R. "Die Orchidaceen von Deutsch-Neu-Guinea". In Fedde, Repert. Sp. Nov., Beih. Band 1(2). 1911.

Seidenfaden, G. "Orchid Genera in Thailand VII. *Oberonia* Lindl. & *Malaxis* Sol. ex Sw.". Dansk Botanisk Arkiv. Bind 33 (1). 1978.

National Herbarium of New South Wales
Royal Botanic Gardens,
Mrs Macquarie's Road,
SYDNEY NSW 2000.

Kerigomnia Van Royen, a new synonym of *Chitonanthera* Schltr. (Orchidaceae: Thelasiinae).

Eric A. Christenson

Abstract

Examination of herbarium material shows the Papua New Guinea genus *Kerigomnia* Van Royen to be based on a misobservation. *Kerigomnia bilabrata* Van Royen has 4, not 2, pollinia and belongs to *Chitonanthera* Schltr. One new combination, *C. bilabrata* (Van Royen) E.A. Christenson, is made.

In 1976 Van Royen described *Kerigomnia bilabrata* for a distinctive alpine orchid from Papua New Guinea. The genus was separated from the similar *Chitonanthera* Schltr. and *Octarrhena* Thwaites by its 2 pollinia; *Chitonanthera* has 4 pollinia and *Octarrhena*, like the remainder of the Thelasiinae, has 8. *Chitonanthera* was separated from *Octarrhena* primarily by its different pollinia number, a distinction overlooked by Dressler (1981). A genus having 2 pollinia would have introduced a third pollinia number to the subtribe.

The minute flowers and pollinaria of this group make examination of detail difficult, such that "the complete structure of the pollinarium is often difficult to ascertain" (Dockrill, 1969). Examination of flowers from *Schodde 1860* (Lae), a collection number cited by Van Royen, clearly shows *Kerigomnia bilabrata* to have 4 pollinia rather than 2 as stated by Van Royen (1976, 1980). This species is therefore better placed in *Chitonanthera* and the new combination is proposed here:

Chitonanthera bilabrata* (Van Royen) E.A. Christenson, *comb. nov.

Basionym: *Kerigomnia bilabrata* Van Royen, Contr. Herb. Austral. 12:2. 1976.

Type: *Hoogland & Pullen 5525,* Goroka Sub district, near Kerigomna camp, 3000m, 5 Jul 1956, Canb; Isotype: Lae!

Additional Specimens:

Mt Wilhelm, east slopes, 2900m, 8 Jul 1959, *Brass 30394,* Lae!; Mt Wilhelm, east slopes, 2650m, 22 Jul 1959, *Brass 30663,* Lae!; Chimbu Subdistrict, Pengagl Creek, 60 00′ S, 145° 00′E, 8900 ft, 3 Feb 1964, *Millar NGF23223,* Lae!; Tambul District, Mt Giluwe, northwest side, 3300m, Mar 1978, *Reeve 264B,* Lae!; Mt Giluwe, western summit grasslands, 10,000 ft, 16 Aug 1961, *Schodde 1860,* Lae!; Chimbu District, Kundiawa Subdistrict, walking track to Keglsugl airstrip, 5° 45′ S, 145° 05′ E, 23 Jun 1968, *Vandenberg NGF39688,* Lae!

This distinctive species is easily recognized by its scattered-verrucose foliage. The leaves are articulate and thus place the species in *Chitonanthera* section *Chitonanthera* rather than *Chitonanthera* section *Podochilodes* Schltr. The dark brownish-orange flower colour is typical for the genus (Schlechter 1913) and the four pollinia are borne on short caudicles like those of *C. angustifolia* Schltr. and *C. falcifolia* Schltr. (Schlechter 1928).

Acknowledgements

I would like to thank Dr E.E. Henty, curator, and his staff at Lae for courtesies extended me during my stay in Papua New Guinea.

Literature Cited

Dockrill, A.W. (1969). Australian Indigenous Orchids: Thelasidinae. 1:653-663. Halstead Press, Sydney.

Dressler, R. (1981). The Orchids, Natural History and Classification: Thelasiinae. 223-224. Harvard University Press, Cambridge, Mass.

Schlechter, R. (1913). Die Orchidaceen von Deutsch-Neu-Guinea: XXII Thelasinae. Repert. Spec. Nov., Beih. 1:897-948.

Schlechter, R. (1928). Figuren-Atlas zu den Orchidaceen von Deutsch-Neu-Guinea: Thelasinae. Repert. Spec. Nov., Beih. 1(21):*t. 1204-1291.*

Van Royen, P. (1976). *Kerigomnia,* a New Genus of Orchids from New Guinea. Contr. Herb. Austral. 12:1-4, t.1.

Van Royen, P. (1980). The Alpine Flora of New Guinea. vol. 2:800-802. Cramer Verlag, Vaduz.

Kerigomnia Van Royen, a new synonym of Chitonanthera Schltr. (Orchidaceae: Thelasiinae).

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Please contact Andrew Richards,
37 Vacy Street, Toowoomba, Qld. 4350.

Rhizanthella gardneri

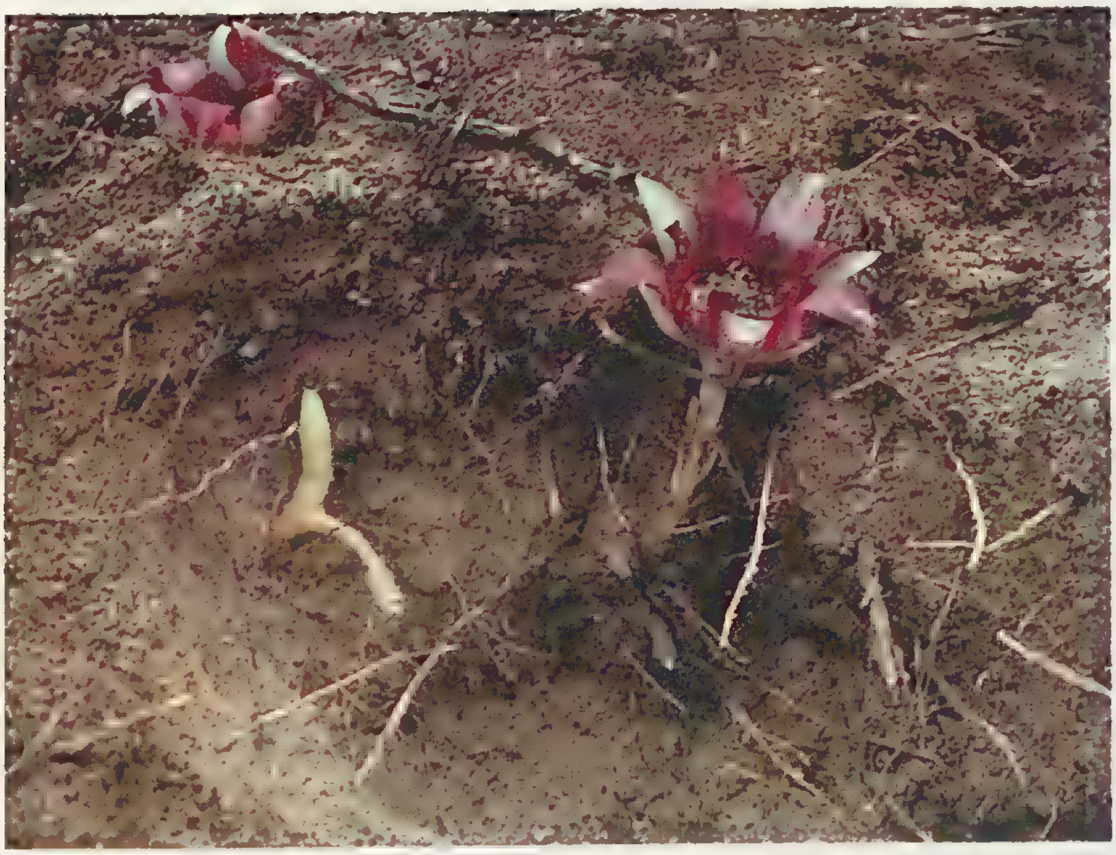
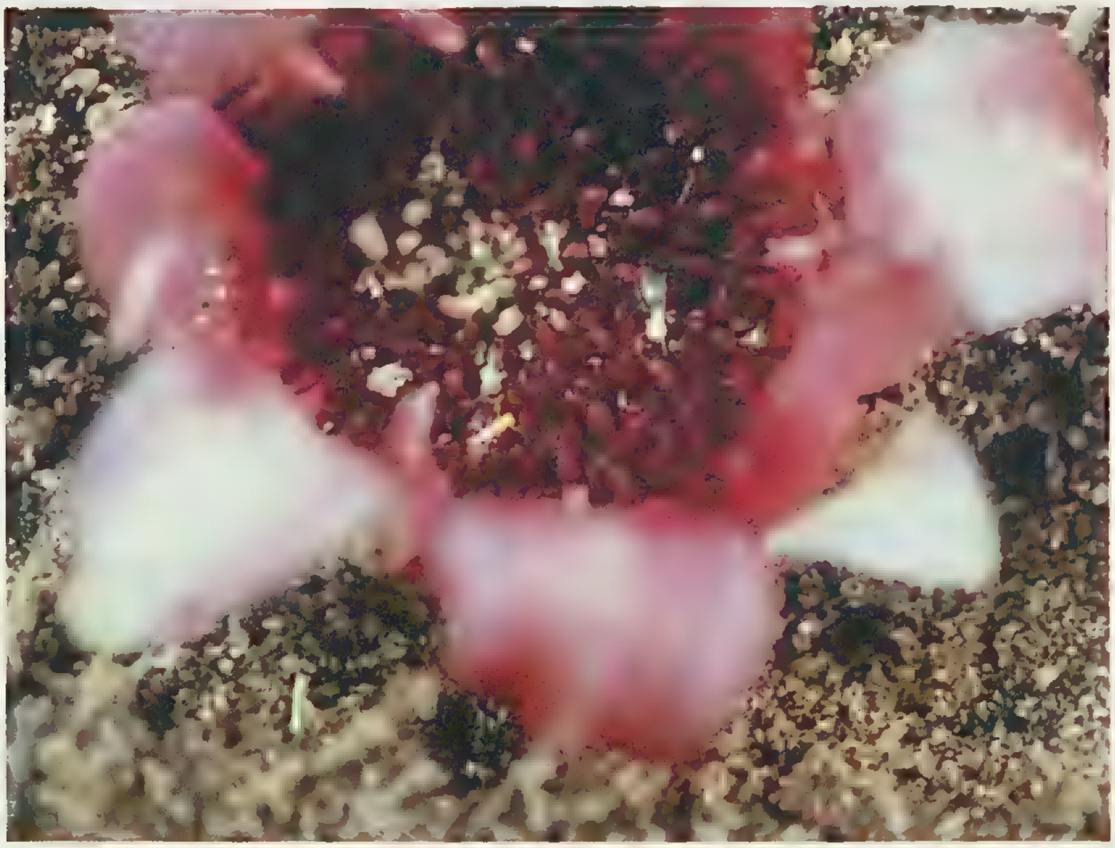


Fig 1. Central wheatbelt form of *Rhizanthella gardneri* (partially excavated — leaf litter and soil removed). Note young floral primordium with depth-seeking daughter tuber).

Fig 2. Termite pollinators with pollinia attached visiting flowers of *Rhizanthella*.



Photographs by courtesy of Dr. K.W. Dixon

Rhizanthella gardneri

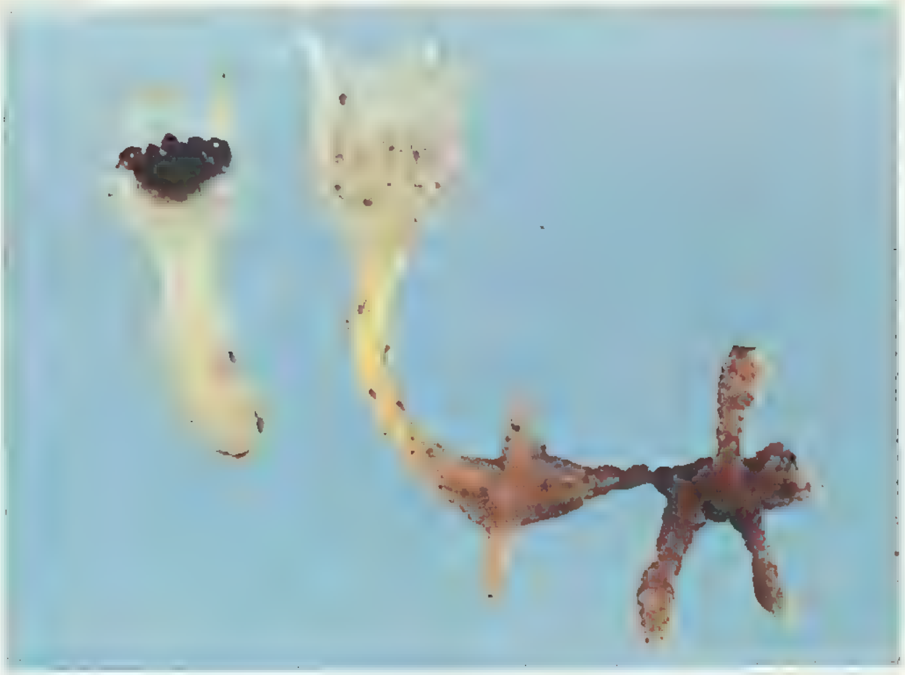


Fig 3. Preserved specimens of *Rhizanthella* showing arrangement of tubers.

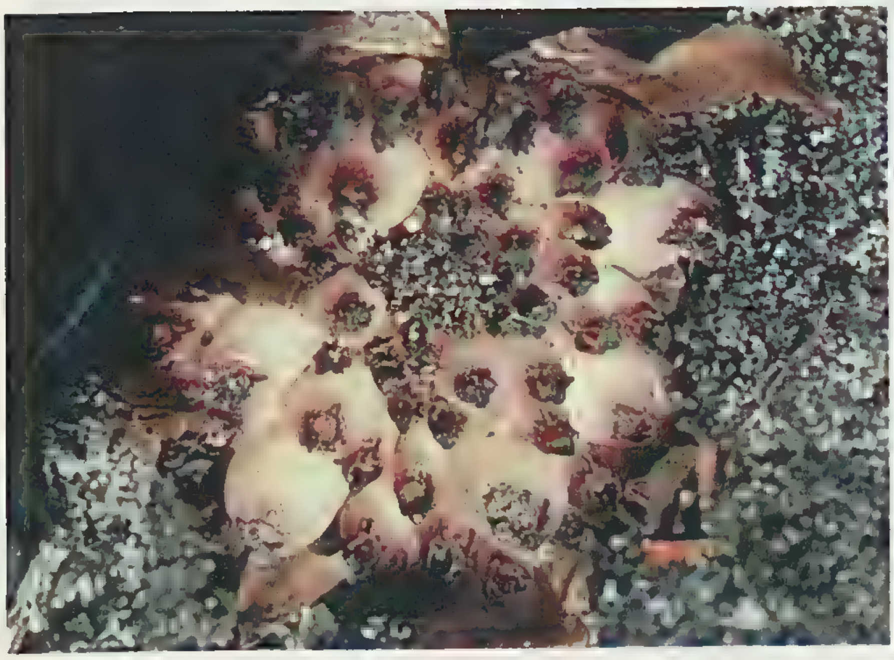


Fig 4. Mature seed pods of *Rhizanthella*, some seven months after flowering has ceased.

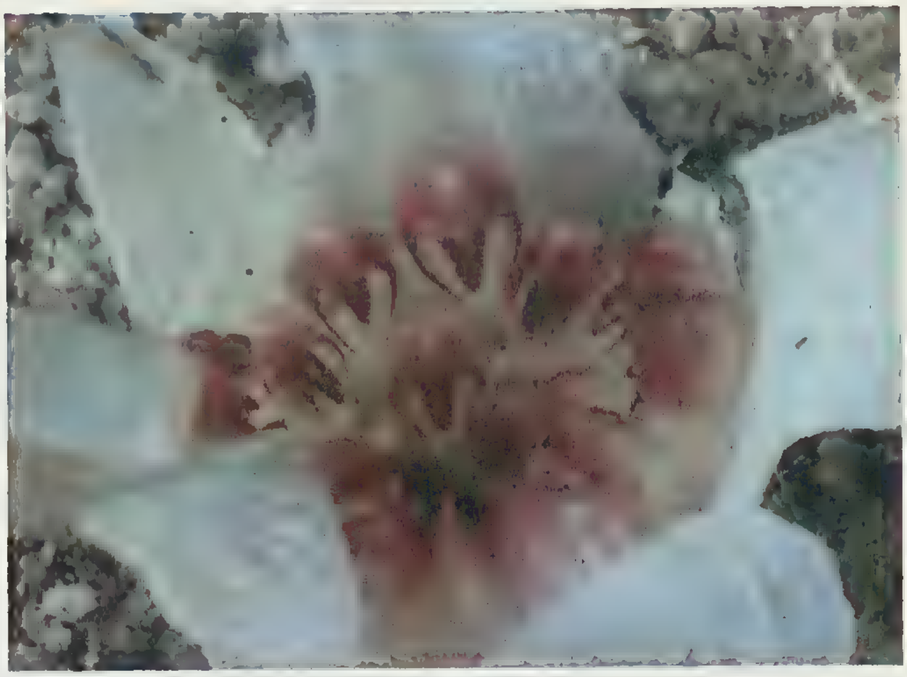


Fig 5. Arrangement of flowers in capitulum of south coast form of *Rhizanthella gardneri*.

Photographs by courtesy of Dr. K.W. Dixon

The Underground Orchids of Australia

Reprinted from The Kew Magazine Vol. 1 Part 2 1984.

by Mark Clements & Phillip Cribb

The intimate role of fungi in the life cycle of orchids was discovered by the French scientist Noel Bernard at the turn of the century (Bernard, 1903). All orchids are now known to require a fungus, termed a mycorrhiza, to germinate successfully. The fungal partner supplies the orchid with essential nutrients, particularly simple sugars for growth. Whereas most orchids eventually produce green leaves and become less dependent upon, or even independent of, their fungal partner, a few are totally dependent upon this relationship. These are popularly called the saprophytic orchids.

The most extraordinary of these 'saprophytes' are two species whose life style has become so modified that the plants germinate, grow and flower without ever coming above the surface of the ground. These are the famous Australian underground orchids *Rhizanthella gardneri* R. Rogers and *Cryptanthemis slateri* Rupp.

Both species consist of branching fleshy rhizomes that grow laterally in sand or soil about 8-20cm (3-8in) below the surface. The inflorescences arising from the apex of one or more of these rhizomes are covered in white or pink scales, the flowers being flesh coloured to maroon.

History

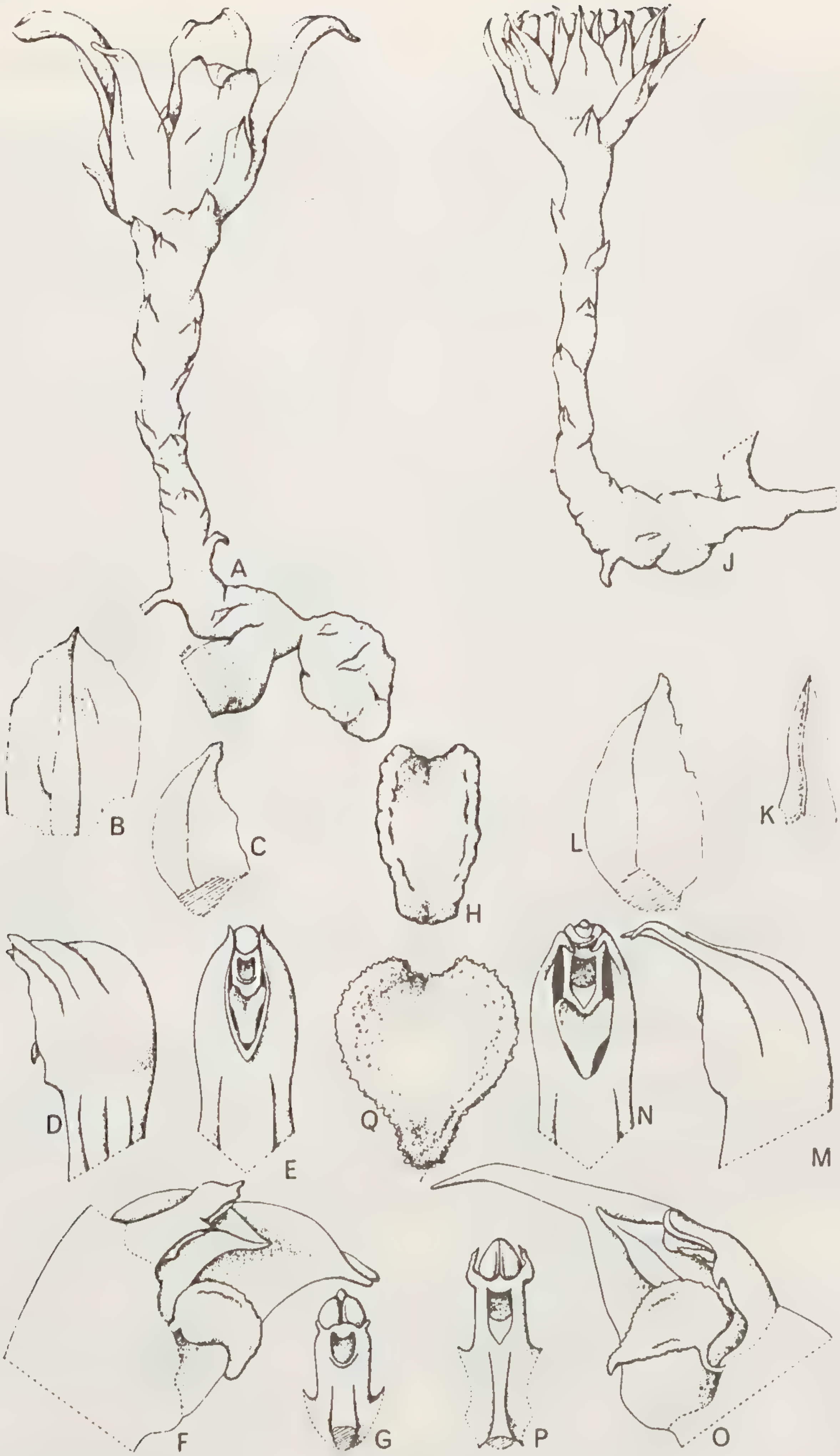
Rhizanthella gardneri was first seen in 1928 by a farmer, John Trott, while ploughing an area of rolled mallee near Corrigin about 200km (186ml) to the east of Perth in Western Australia. In all he uncovered 36 plants in the area. During the next 40 years it was seen again only twice: once in 1940 when Trott again found a plant at Corrigin and in 1962 at Babakin when C.W. Bee also found a single specimen. By the early 1970s it was generally considered to be extinct. However, through the perseverance of Alex George of the Western Australian Herbarium it was rediscovered in 1979 near Munglinup, some 500km (310ml) SE of the original site by John McGuiness (for an account of this see George, 1980). It was found growing, as in its other sites, at the base of *Melaleuca uncinata* R.Br. in mallee scrub. Subsequent searches in the few remaining areas of *M. uncinata* similar to that at Munglinup, have revealed about 100 plants in a further 10 or so sites.

The second species, *Cryptanthemis slateri* Rupp, was discovered by E. Slater in November 1931 on the opposite side of the continent in New South Wales. He found it at Buladelah, Alum Mt, amongst the roots of a plant of *Dipodium punctatum* (J.E. Smith) R.Br. which he was lifting to transfer to his garden. It has subsequently been seen three times. Kesteven and Rupp relocated it two years later (1933), in the type locality, bringing to 12 the number of plants found at that site. Subsequently, it was found in Lamington National Park, on the Queensland — New South Wales border, in a road cutting and also at Springwood in the Blue Mountains west of Sydney, where it was found in ground being prepared for the foundations of a garage. It has not been seen now for nearly 20 years despite frequent searching. Unlike *R. gardneri,* it does not appear to be associated with a particular *Melaleuca* species, but it is found in *Eucalyptus* forest.

Biology of the Species

The significance of the relationship between *Melaleuca uncinata* (Myrtaceae) and *R. gardneri* is still not fully understood. Recent research has shown that the mycorrhizal fungus found within the rhizome of *R. gardneri* also occurs on the papery surface of the roots of the *Melaleuca* (Dixon, 1982). However, this may be coincidental rather than of significance for there appears to be no evidence of this fungus being a parasite on the *Melaleuca.* Rather it seems likely the fungus feeds on the dead leaves of the *Melaleuca* which are abundant under every bush.

Both species have long been thought to be self-pollinating (e.g. Dressler, 1981). However, a tiny fly (*Megaselia* sp.) has recently been caught emerging from the orifice of a flower of *R. gardneri* with pollen massulae adhering to its thorax (George, 1981). These have been confirmed as belonging to the orchid. Apparently, the fly is attracted to the flowering head of *R. gardneri* by its faint scent. It then, enters through the orifice above the flower-head presumably for food, inadvertently pollinating some of them. If it again visits another flowering plant cross pollination would result. The pollinators of *C. slateri* are as yet unknown. The large hard seeds of *R. gardneri* are thought to be dispersed either by small native mammals eating the capsule and the seeds passing through in the faeces or by white ants which are known to eat the capsules of the plant.



Rhizanthella gardneri. *A,* habit, x 1½; *B,* bract, x 3; *C,* lateral petal, x 12; *D,* flower, lateral view, x 6; *E,* flower, front view, x 6; *F,* flower, half-section x 12; *G,* column, front view, x 12; *H,* lip, x 18. ***R. slateri.*** *J,* habit x 1½; *K,* bract, x 3; *L,* lateral petal, x 6; *M,* flower, lateral view, x 6; *N,* flower, front view, x 6; *O,* flower, half-section, x 9; *P.* column, front view, x 12; *Q,* lip, x 18.

Morphological Comparison

Through the courtesy of the curators of the National Herbarium New South Wales, Royal Botanic Gardens, Sydney and of the Western Australian Herbarium, we have had the opportunity to examine and compare material of both species preserved in alcohol. Several authors (Nicholls, 1965; Clemesha, 1968; Balogh, 1982) have commented on the similarity of the two species and indeed it has been suggested they may belong in the same genus.

In describing *Cryptanthemis,* Rupp (1932) gave four reasons for considering it distinct from *Rhizanthella.* He suggested that the sepals and petals of *Cryptanthemis* were membranous and the flower continuous with the ovary with the point of union quite obvious. Its sepals and petals are in fact fleshy and the point of union of the flower and ovary no more nor less obvious than in *Rhizanthella gardneri.* Secondly, the figure shows quite clearly that the sepals of *Rhizanthella* are only united towards the base and do not form a 'tube or bell' as Rupp suggested. His third distinction concerns the lip which he stated to be rather small and attached to a long claw in *Cryptanthemis.* Again, the accompanying illustrations show clearly that in both species the lip and claw are essentially similar. Finally, he stated that the column of *Cryptanthemis* is quite free and bears two lateral appendages (staminodes). However, in both species the column is fused at its base to the base of the petals. Whilst agreeing that the staminodes of *Cryptanthemis* are obvious it is also apparent that these, albeit reduced in size, are also present in *Rhizanthella gardneri.*

Cryptanthemis and *Rhizanthella* do differ in some features, however (see Table 1). For example, each flower in *Rhizanthella* is subtended by a one-veined bract, the outer bracts surrounding the capitulum being 3-veined and much larger. All the bracts in *Cryptanthemis* are one-veined. The flowers of *Cryptanthemis* are indeed slightly larger than those of *Rhizanthella* and differ in having sepals with acuminate tips. The lip of *Cryptanthemis* is more papillose than that of *Rhizanthella* but of an essentially similar shape. We are, therefore, convinced that we are considering two closely allied species in the same genus. Since *Rhizanthella* is the earlier generic name we hereby transfer *Cryptanthemis* to the genus as follows:—

Rhizanthella slateri (Rupp) M. Clements et Cribb comb. nov. *Cryptanthemis slateri* Rupp in Proc. Linn. Soc. N.S.W. 57:58 (1932). Type: N.S.W., Alum Mt., Buladelah, Nov. 1931, Slater (NSW, holo.; K, part of holo.!)

The Generic Affinities of *Rhizanthella*

The generic affinities of *Rhizanthella* (including *Cryptanthemis*) have long been the cause of considerable speculation, possibly due to the lack of access to adequate preserved material. Rogers (1928) in describing the genus *Rhizanthella* placed it in its own subtribe Rhizanthellinae of the tribe Gastrodieae. Lavarack (1971 & 1976) and Dressler (1981) have

Table 1

Character	Rhizanthella slateri	Rhizanthella gardneri
Habit	subterranean saprophyte	subterranean saprophyte
Rhizomes: roots	elongated, branching, roots absent or much reduced	elongated, branching; roots absent or much reduced
Inflorescence	a very condensed, conical capitulum	a concave capitulum
Flowers	small, white and maroon	small, white and maroon
Sepals	basally fused	basally fused
Petals	one-veined, ovate, adnate to column towards base	one-veined, ovate, adnate to column towards base
Lip	fleshy, conduplicate, hinged to column-foot, entire	fleshy, conduplicate, hinged to column-foot, entire
Spur	absent	absent
Column-foot	short	short
Column	fused to petals in basal part	fused to petals in basal part
Stigma	a shallow cavity with a raised rim	a shallow cavity with a raised rim
Staminodes	obvious, elongate	present but very short
Anther	erect, fixed with a prominent conical connective	erect, fixed with a prominent conical connective

Table 2

Character	Genoplesium	Cephalanthera	Limodorum	Aphyllorchis	Gastrodia
Habit	terrestrial semi-saprophyte	terrestrial autotropic (chlorophyllus)	terrestrial saprophyte	terrestrial saprophyte	terrestrial saprophyte
Rhizomes: roots	abbreviated, sometimes branching; roots absent	short; roots thin, spreading radially	thick, vertically elongate; roots v. thick fleshy, elongate; spreading radially	short, thin slightly fleshy; roots short fleshy, spready radially	elongate, thick, fleshy; roots absent or thin elongate arising radially at base of inflorescence
Inflorescence	raceme	raceme, with leaves	raceme	raceme	raceme
Flowers	small, red, pink & yellow	large, white, yellow or pink	large, cream, mauve or purple	small to large, mauve or cream	large, brown, cream or mauve
Sepals	free	free	free	free	fused
Petals	3-veined, lanceolate	3-veined lanceolate	3-veined, ellipticlanceolate	1 veined, lanceolate-elliptic	3-veined fused to petals
Lip	fleshy, conduplicate, hinted to column-foot	thin-textured, flat or with incurved margins, attached to base of column and shortly adnate at base, 3-lobed	thin-textured, flat, incurved, margins adnate to base of column, 3-lobed	lanceolate-elliptic fleshy, saccate, obscurely 3-lobed	thin, flat with 2 sets of calli, one basal the other near the apex; obscurely 3-lobed
Spur	absent	present in a reduced form	present	absent	absent
Column-foot	present	absent	absent	absent	
Column	free	fused to base of lip	fused to base of lip and spur	free	free
Stigma	shallow, bi-lobed	raised, 3-partite	raised, 3-partite	slightly raised	a shallow cavity
Staminoides	obvious, elongate	absent	present much reduced	absent	absent
Anther	± erect, fixed with a prominent conical connective	erect, attached to a filament and mobile, lying in a terminal concave clinandrium	erect, attached to a filament and mobile, lying in a terminal concave clinandrium	erect, attached to a filament and mobile, lying in a terminal concave clinandrium	erect, attached to a short filament and mobile, lying in a terminal concave clinandrium

maintained this attribution on the basis of the plants having mealy pollen, partially fused perianth segments and a saprophytic habit. More recently, the affinities of *Rhizanthella* have been questioned by Balogh (1982), who considered it most closely related to *Cephalanthera,* a north temperate genus in the subtribe Limodorinae of the tribe Neottieae. This conclusion was based on supposed similarities in column, anther and pollen morphology. We have compared the floral structure of *Rhizanthella* with representatives of the genera *Gastrodia* in the Gastrodieae, *Cephalanthera, Limodorum* and *Aphyllorchis* in the Limodorinae and the results can be seen in Table 2. The supposed resemblance of *Rhizanthella* to *Gastrodia* lies in the saprophytic habit and in the fused floral segments. However, in its column structure in particular, in its rigid erect anther, prominent connective and simple lip lacking calli and attached to the column-foot by a cartilagenous hinge, *Rhizanthella* appears quite distinct from any member of the Gastrodieae. Furthermore, in *Gastrodia* the petals are fused to the sepals and the latter are fused almost to the apex forming a tube with a narrow mouth. In contrast the sepals are only shortly fused, at the most, in *Rhizanthella* and the petals are shortly fused to the column rather than to the sepals.

Cephalanthera and related genera have an erect terminal anther, articulating on the slender filament, set in a deep clinandrium at the apex of the column. The lip at its base is fused to the basal margins of the column and is not hinged. In *Limodorum,* the lip is also spurred. The flowers have thin-textured segments which are free from each other to the base. The sketches given by Balogh (1982) comparing *Rhizanthella* and *Cephalanthera* columns are oversimplified and consequently misleading. She also compares the pollinial structure and pollen surface morphology of these genera.

They are indeed rather similar but no more so than other genera of the Neottieae.

Dressler & Dodson (1960) suggested that the affinities of *Rhizanthella* might lie with the Australian Diurideae, although the former later changed his mind (Dressler, 1981.) We consider that the affinities of *Rhizanthella,* so far only recorded from Australia, deserve reconsideration especially as the Gastrodieae are predominantly of Asiatic and the Limodorinae of North Temperate/Asiatic distribution.

The column structure of *Rhizanthella* is reminiscent of that found in the saprophytic orchid *Genoplesium baueri* and in *Prasophyllum* sect. Micranthum. These small flowers are also similar having a simple hinged lip attached to a short column-foot and are pollinated by similar insects, i.e. small *Diptera* spp. In both *Genoplesium* and *Prasophyllum* a short stipe attaches the viscidium to the pollinia but we have seen no similar structure in *Rhizanthella.* We are also at a loss to explain the rhizomatous habit of *Rhizanthella,* but it must be said that whereas stem-root tubers are present in most Diurideae some lack them e.g. *Rimacola.* However, it has been shown that *Rhizanthella* uses a similar mycorrhizal fungus to the Diurideae. (Warcup pers. comm.). The likelihood of *Rhizanthella* being a member of the Diurideae Endlicher, which is the best represented tribe in the Australian orchid flora, seems to us a suggestion that warrants further investigation.

The Conservation of *Rhizanthella*

The two species of *Rhizanthella* are rare plants. It could be argued that their rarity is an illusion because underground orchids are never easy to find. However, we know in the case of *R. gardneri* that it only grows in association with *Melaleuca uncinata,* a species formerly abundant and widespread throughout much of south-west Western Australia but now greatly reduced in its extent because of agriculture, the mallee country in which *M. uncinata* grows being prime wheat growing country in that part of Australia. Consequently, less remains nowadays. Again, *R. slateri* is associated with a (potentially) endangered habitat, for the forests of eastern Australia continue to be felled at an alarming rate. Because so little is known about the habitat requirements of *R. slateri* it is possible that sites in which this orchid occurs are being destroyed for agriculture, housing, or forestry.

It is therefore of considerable interest to note that attempts to grow *R. gardneri* from seed, both symbiotically and asymbiotically, are distinctly promising (Warcup. pers. comm.). Although news of the successful culture of *Rhizanthella* is keenly anticipated the only real hope for these plants lies in the protection of their natural habitats. We are pleased to report that such is the case in Western Australia where several areas in which *R. gardneri* grows have been set aside as reserves specifically for the protection of the species. The search for *R. slateri* in the east of the continent continues and we eagerly await news of its rediscovery.

Acknowledgements

We wish to thank Don Blaxell, Royal Botanic Gardens, Sydney, New South Wales, Kevin Kenneally, Western Australian Herbarium and Alex George, Bureau of Flora & Fauna, A.C.T. Part of this research was funded by the Sainsbury Trust through the Bentham-Moxon Trust.

References

Balogh, P. (1982). *Rhizanthella* R.S. Rogers, a misunderstood genus. (Orchidaceae). Selbyana 7(1):27-33.

Bernard, N. (1903). La germination des orchidees. Comp. Rend. Acad. Sci. Paris 137: 483-485.

Clemesha, S.C. (1968). Saprophytic orchids of Australia and New Zealand (in part). The Orchadian 2,11: 143.

Dixon, K.W. (1982). *Rhizanthella* in 1981. The Orchadian 7,5: 99-100.

Dressler, R.L. (1981). The Orchids: Natural History and Classification. Harvard University Press, Cambridge, Massachusetts, USA.

Dressler, R.L. and Dodson, C.H. (1960). Classification and phylogeny in the Orchidaceae. Ann. Miss. Bot. Gard. 47: 25-68.

George, A.S. (1980). *Rhizanthella gardneri* R.S. Rogers — the underground orchid of Western Australia. Amer. Orchid Soc. Bull. 49, 6: 631-646.

George, A.S. & Cooke, J. *Rhizanthella* — the underground orchid of Western Australia. Proc. Orchid. Symp. 13th Int. Bot. Congress, Sydney, Australia, 1981: 74-75, 77-78.

Lavarack, P.S. (1971). Numerical methods in the taxonomy of the orchids. In Corrigan M., Proc. 6th World Orchid Conference. Sydney. 1969. & NSW Orchid Soc., Sydney, Australia.

— (1976). The taxonomic affinities of the Australian Neottioideae. Taxon 25, 2-3: 289-296.

Nicholls, W.H. (1965). Orchids of Australia: The complete edition drawn in natural colour by W.H. Nicholls with descriptive text: Edited by Jones, D.L. and Muir, T.B. Nelson, Melbourne, Australia.

Rogers, R.S. (1928). 1 — A new genus of Australian Orchid. J. Roy. Soc. Western Australia 55: 1-76.

Rupp, H.M.R. (1982). Notes on New South Wales orchids -II. Proc. Linn. Soc. New South Wales 57: 57-61.

The Self-Pollination of *Epipogium roseum* (D. Don) Lindley

by David L. Jones

In this paper it will be established that *Epipogium roseum* is self-pollinating and the mechanism of autogamy will be elucidated.

Orchid Biology

Epipogium roseum is a saprophytic orchid widely distributed in many parts of the world's tropics including Australia. In Australia it is distributed from north-eastern Queensland to north-eastern New South Wales. It is predominantly an orchid of rainforests, although it does occur in other habitats such as open forest. Plants flower November to February and are greatly influenced by the summer rains. They usually grow in small crowded groups, and in years of heavy early rains may be extremely abundant. Being a saprophyte, no leaves are produced and the species relies for its existence on a symbiotic relationship with a mycorrhizal fungus. Plants usually occur in the vicinity of a dead tree where the fungal relationship can be maintained. The life cycle of this orchid is extremely rapid, with the time from its emergence to the release of seed being a matter of 7-10 days. Consequently, plants are easily missed.

Epipogium roseum perennates in the ground as a large, swollen, irregular, brownish rhizome. The following stems are 5-60 cm tall and are cream to pale yellow, fleshy, brittle and hollow. The stem is at first nodding but straightens as the flowers open. Between 5 and 35 flowers are carried in a loose raceme.

Floral Details

The perianth segments overlap and do not spread widely and hence the flowers have a semi tubular appearance. They are a dull white or cream in colour. The labellum is quite broad and deeply concave and has a fairly large spur at the base. A few glands in rows extend from near the base to near the tip. The column is quite short and is strongly curved with a very large anther cap and prominent basal stigma. The stigma is heart-shaped and divided into two lobes. The rostellum is tongue-shaped and is situated at the apex of the column immediately below the anther cap. The anther cap is of most unusual structure, for the upper two thirds is solid and fleshy and is expanded at the base into two flaps each containing a pollinarium. Each pollinarium consists of a pair of pollinia united to a long, slender caudicle. The pollinia is coarsely structured into fairly large aggregates.

Relict Pollination Features

Epipogium roseum is entirely autogamous; however, it retains some features normally associated with cross pollination. These may be considered as relicts, for they do not influence the process of autogamy. The flowers exude a musty scent which becomes obvious at about 20°C. The spur on the labellum is also full of a fluid which is presumably nectar. Other relictual features include a much reduced callus on the labellum and vestigial caudicles on the pollinarium.

Autogamous Sequence

The mechanism of self-pollination adapted by *Epipogium roseum* is very simple and can be followed in the accompanying drawings.

In the very early bud the stigma is quite small and is separated from the surface of the pollen by the flaps of the anther. At this stage the caudicle of each pair of pollinia is held upright against the front of the anther cap.

As the bud expands the stigma increases in size until the two lobes are in close contact with the pollinia. By this time the flaps of the anther cap have retracted and direct contact can be made between the pollen and the stigmatic tissue. Once contact is made the stigma does not seem to expand much further, however the pollinia may swell and then lose all coherence. After what appears to be a short time the pollen is firmly attached to the stigma.

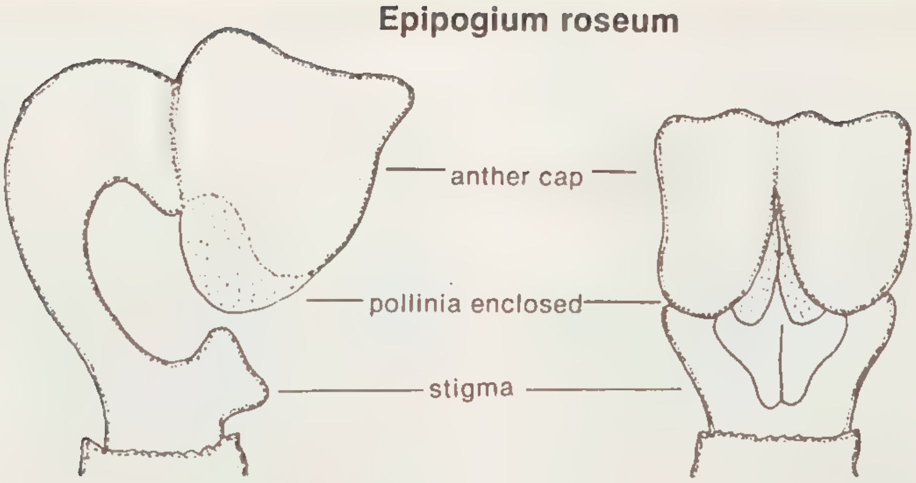
By the time a flower opens the above process is well underway and there is no way a pollinarium can be withdrawn by a visiting insect. Frequently at anthesis the caudicles of the pollinia have sprung out and project away from the anther cap.

Each flower of the orchid is only open for a couple of days before closing. During this time the ovary swells remarkably, seeming to triple or quadruple in size.

In summary the process of self-pollination in this orchid is fairly simple with the stigma expanding until it contacts the base of the pollinia. Some retracting movements of the anther flaps facilitate contact. At no time in this process does the rostellum become stigmatic.

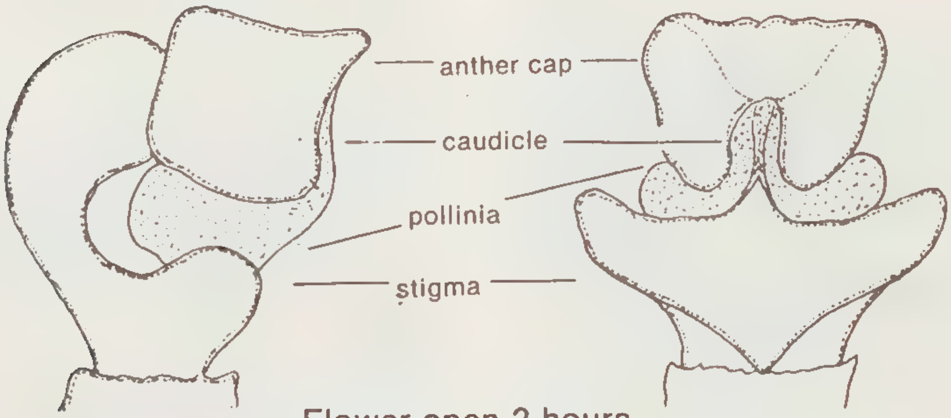
Continued. next page

Epipogium roseum



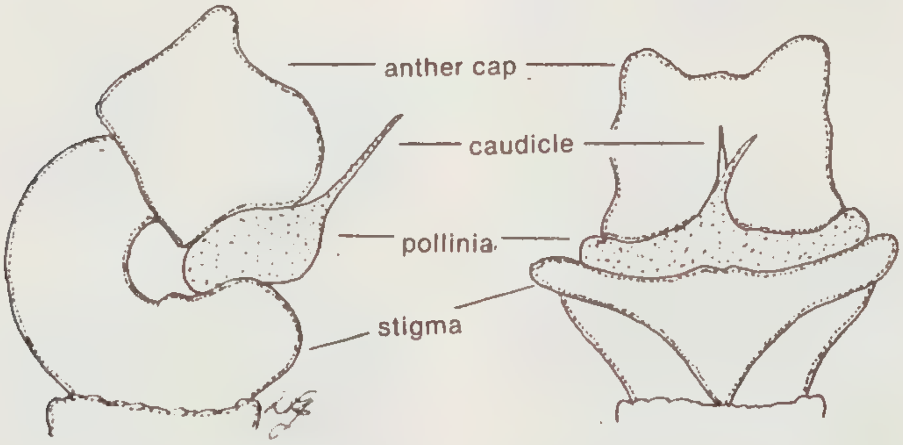
Early Bud

column from side x 20 column from front x 20



Flower open 2 hours

column from side x 20 column from front x 20



Flower open 12 hours

Drawings by D.L. Jones

Post Pollination

As noted earlier, the ovary of *Epipogium roseum* swells rapidly after the stigma contacts the pollinia. Seed dispersal may occur some 5-7 days later making this a very rapid and efficient mechanism. It is interesting to note that the ovaries remain pendulous and do not become erect after fertilization as they do in some other orchids e.g. *Gastrodia sesamoides.*

Acknowledgements

I wish to thank John Leaver for bringing the orchid to my attention and Barbara Jones for typing the manuscript.

David L. Jones
P.O. Box 261
Palm Beach
Qld. 4221.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the R.H.S. from lists in the Orchid Review September — December 1984 and January — April, 1985.)

NAME	PARENTAGE	REGISTERED BY
DENDROBIUM		
Donie	Rachelle Simpson x *bigibbum*	Mr & Mrs D. Bearden (O/U)
Reg Burns	*dicuphum* x *fleckeri*	M.R. Zeller
Cherub	Peter Peterson x *carronii* *	D'Bush Orchid Nursery
John's Charm	*undulatum* x *semifuscum* *	D'Bush Orchid Nursery (Limberlost Nursery)
Minnie	*carronii* x *johannis*	D'Bush Orchid Nursery
Nerang	Wyuna x *speciosum*	C.J. Brandon
Ronald Banks	Double Two x *speciosum*	D. Banks
Telekon	Hilda Poxon x *kingianum*	D. Banks
Ultravox	Bardo Rose x Andrew Persson	D. Banks
Vida Banks	Hilda Poxon x Wonga	D. Banks
Warrior	Hilda Poxon x Ku-Ring-Gai	D. Banks
** Golden gascades	*gracilicaule* x *ruppianum*	R.C. Arnott
Dainty Cascades	*pugioniforme* x *tenuissimum*	W.T. Upton
Elfin	Dainty Cascades x *kingianum*	W.T. Upton
Pink Pencil	*kingianum* x *teretifolium*	W.T. Upton (I. Butler)
Rutherford Surprise	Hastings x *kingianum*	T.J. Smith
Warringah	*bigibbum* x *speciosum*	W.T. Upton
Wesley Rose	Pink Pencil x *speciosum*	W.T. Upton
DIURIS		
Harlequin	*longifolia* x *punctata*	L.T. & M.K. Nesbitt
PTEROSTYLIS		
Nodding Grace	*curta* * x *nutans* *	R.C. Nash
Elegance	Ingens † x *robusta* *	R.C. Nash
Joseph Arthur	Ingens x *curta*	R.C. Nash
Mary Eleanor	Ingens x *cucullata*	R.C. Nash
Hoodwink	*x ingens* x *baptistii*	L.T. & M.K. Nesbitt
Velvetine	Cutie *xx ingens*	L.T. & M.K. Nesbitt

* First occurrence as a parent in hybrid registration.

† First occurrence as a parent in hybrid registration of the natural hybrid *Pterostylis* x *ingens* (hort. Ingens) (= *nutans* x *falcata* *).

** Not previously recorded from July 1984 Orchid Review.

NEW TERRESTRIAL HYBRIDS

by Les Nesbitt

Notification has been received from the Royal Horticultural Society in London that three new terrestrial hybrids have been registered with the names, *Diuris Harlequin, Pterostylis Hoodwink* and *Pterostylis Velvetine* (see Hybrid List this issue).

Diuris Harlequin grows to 350mm tall. The plant has 3 or 4 leaves to 180mm long x 10mm wide at the base. This hybrid carries 4 to 6 flowers up to 30mm wide across the petals. The flowers are cream-brown overlaid with purple. The clear mauve-purple of *Diuris punctata* has been mixed with the diffused colours of *Diuris longifolia*. Other longifolia hybrids I have seen, viz. Pioneer and *longifolia* x *pedunculata*, also show this colour blending effect. Whether clear colours can be produced from longifolia hybrids in future remains to be seen. Perhaps if someone uses that pure yellow longifolia we hear about but never see? *Diuris longifolia* will continue to be an important parent because it has large, flat, shapely flowers. Unlike the parent its hybrids are free flowering. Plants of *Diuris* Harlequin are easy to grow but do not multiply. The tuber is a long thin vertical tuber with a fork at the bottom end.

Pterostylis Hoodwink produced a flower intermediate between the parents. The first

Continued, next page

A Square Metre of "Moss Garden" and its Inhabitants

by Bullant Esq.

Field workers are well aware of moss as a host for certain of our native orchid species. A recent family field excursion led to the discovery of a colony of native terrestrial orchids growing in moss in suburban Sydney. It's always exciting to find native orchids surviving in a large city and thrilling when such a location supports a large number of species in limited numbers.

Our "moss garden" measures barely a square metre in area and has produced a new species each month for the last four months! It is located in Elanora Heights in an area of near virgin bushland. The orchids are growing in moss on a sloping sandstone ledge exposed to the elements for almost 360°, at an elevation of 500 feet.

Our first visit in early September was rewarded with the discovery of 11 plants of *Caladenia carnea* var. *pygmae* in flower.

In October we found that the *Caladenias* had finished flowering and only the withered remnants attested to their presence. However, a new terrestrial was in evidence, a *Thelymitra* species, most plants approximately 8" high, with some just beginning to show buds.

Our November visit was a partial disaster, the *Thelymitra* species had flowered, withered and died, leaving insufficient material for positive identification. Perhaps the extremely hot spell in late October had prematurely burnt off the plants. Certainly the moss was completely dry and devoid of any visible moisture.

Our reward was the seven magnificent plants of *Paracaleana minor* in full bloom. In 29 years of field study I have only found *Paracaleana minor* twice. The plants stood some 55mm high and several displayed two flowers. As I lay on my stomach photographing these beauties I became aware of an extremely agitated guardian, some inches from the lens, who obviously resented my presence.

Through the SLR lens he looked enormous and when I removed my eye from the viewfinder he didn't look much smaller. My agitated friend was the largest "bull ant" I have encountered. He was at least 31mm long and a real heavyweight! When I hastily removed myself from the immediate area he resumed his patrol of the orchid colony. His interest in the orchids was clearly evident, as he moved from plant to plant, testing each by clasping the plants with his mandible. Perhaps he hoped for a meal from any prospective pollinating insect who happened along. In any case he remained with the orchids during the whole of our visit.

The fourth orchid species was also in evidence — *Cryptostylus* leaves without doubt! Our December visit to the "moss garden" confirmed that it was *Cryptostylus subulata.* Four native orchids in four months from a single square metre of moss is incredible. Further study next year will perhaps produce identification of the *Thelymitra,* and even further species.

Tragically the "moss garden" will soon disappear into suburbia. The area has been subdivided, roads tarred, locating posts positioned and the land developer sign erected, proudly announcing that the land has been brought to the market by "xxxxxxx", one of Australia's largest transport conglomerates. At $69,000, the 1 hectare block is one of the cheapest, they peak at $330,000! Perhaps the asking price will at least temporarily delay the inevitable "progress".

NEW TERRESTRIAL HYBRIDS

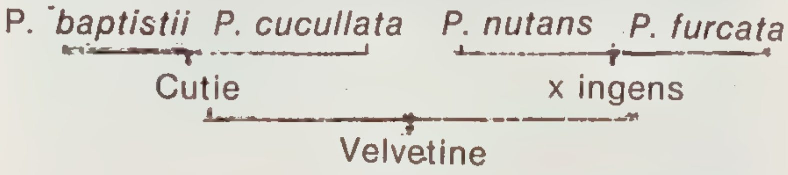
Continued

flowering in October 1984 on a plant 180mm tall had a single large green and white flower which leant slightly forward. I expect the *x ingens* influence to produce robust plants with tall flower stems to 400mm high as the plants mature. It should multiply freely. This cross was made in 1979 using *baptistii* 'Janney' which is a spring flowering clone of superior form. The wide flaring of the petals did not carry through to the hybrid.

Pterostylis Velvetine was also made in 1980 and the first 3 plants flowered in October 1984 out of a batch of about 20 small plants. The flowering plants were only 100mm tall but each carried one large green, white and brown flower. The front surfaces of the ventral sepals had a velvety texture but the brown colouration of *P. cucullata* in this area has been lost. One of the plants was dark brown on the top of the hood but the other two were very pale brown. The forward lean of *P. nutans* and the narrow pointed galea of *P. furcata* show in the hybrid even though it is a second generation hybrid.

These seedlings are already multiplying and should form tall robust plants in another year or so.

Pterostylis Velvetine's parentage



18 Cambridge St
Vale Park SA 5081

Protection Achieved

by Gerry Walsh

Postscript .....

During subsequent discussions with Mr Alexander, he raised the issue of assistance from A.N.O.S. members and the public in general. Because the N.P.W.S. is short on manpower, its officers are unable to effectively police commercial pickers in the field to ensure that they are working within the bounds of their licences. It is unrealistic to believe that the N.P.W.S. could ever employ enough rangers to supervise the collection and removal of native flora. (They should always have at least one officer, whose duty would be to investigate areas to be 'picked' BEFORE granting a licence to allow the same. There's a wise old adage: No use in closing the gate after the horse has bolted.) Mr Alexander cited an example where we could all assist the N.P.W.S. in the execution of its duties. If anybody observes a truck or other vehicle loaded with protected flora, he requests that the registration number be recorded, along with the date and location. This information should be sent to A.N.O.S. Council for recording and delivery to his Department. Mr Alexander pointed out that A.N.O.S. members are frequently in locations where such sightings are most likely to be made. This is very true.

Mr Alexander also informed me that several prosecutions had recently been instigated after checks were carried out at certain drive-in markets and plant stalls. One person was caught offering approximately 50 plants of *Sarcochilus fitzgeraldii* for sale for which he had no licence and no protected plant tags attached. He requested that A.N.O.S. members who visit such outlets report any law infringements or irregularities. Your assistance is needed if the money chasing plunderers of our society are to be halted. Commercial pickers working within the law have nothing to fear — it's the rotten applies that have to be squashed.

Mr Alexander greatly stresses that complete confidentiality is assured to all persons who volunteer information to his Department. All reports will be investigated and the N.P.W.S. would be very appreciateive of any assistance received.

Gerry Walsh
7 Leslie Court,
Werrington 2760.

1985 A.N.O.S. GROUP SHOWS

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Phone:— (043) 88 1785

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Phone:— (02) 992 468

Wollongong Group

26th, 27th, 28th September
Warrawong Shopping Centre
Phone:— (042) 564 228

Sydney Group (Castle Hill)

28th and 29th September
Castle Hill Showground, Showground Road, Castle Hill
Phone:— (02) 535 8769

Newcastle Group

14th and 15th September
Newcastle College of Advanced Education
Phone:— (049) 430 882

IRA BUTLER TROPHY COMMITTEE — Notice to Group Secretaries.

As previously, the winning entries in the Australian Native Hybrid section of your Winter and Spring Shows are eligible.

We again remind you that the photographic slides of your entries should be clear and of good quality. Your plants will be judged from these slides. An important point seems to have been overlooked. **A slide of the full plant means just that,** not just a spray of flowers. Show the base of the plant at least, so we can judge the quality of the growth. Slides that do not comply, could cause rejection of the entry.

Entry forms available from the Hon. Secretary of the Ira Butler Trophy Committee, Ruth Rudkin, 18 Lyle Avenue, Lindfield, 2070.

All entries must be in our possession by 8th November, 1985.

Hybrid Checklist.

An updated checklist of Australian Native Orchid Hybrids will shortly be available from A.N.O.S. Secretary, P.O. Box C106, Clarence Street, 2000. Order Now at $2.50 plus postage.

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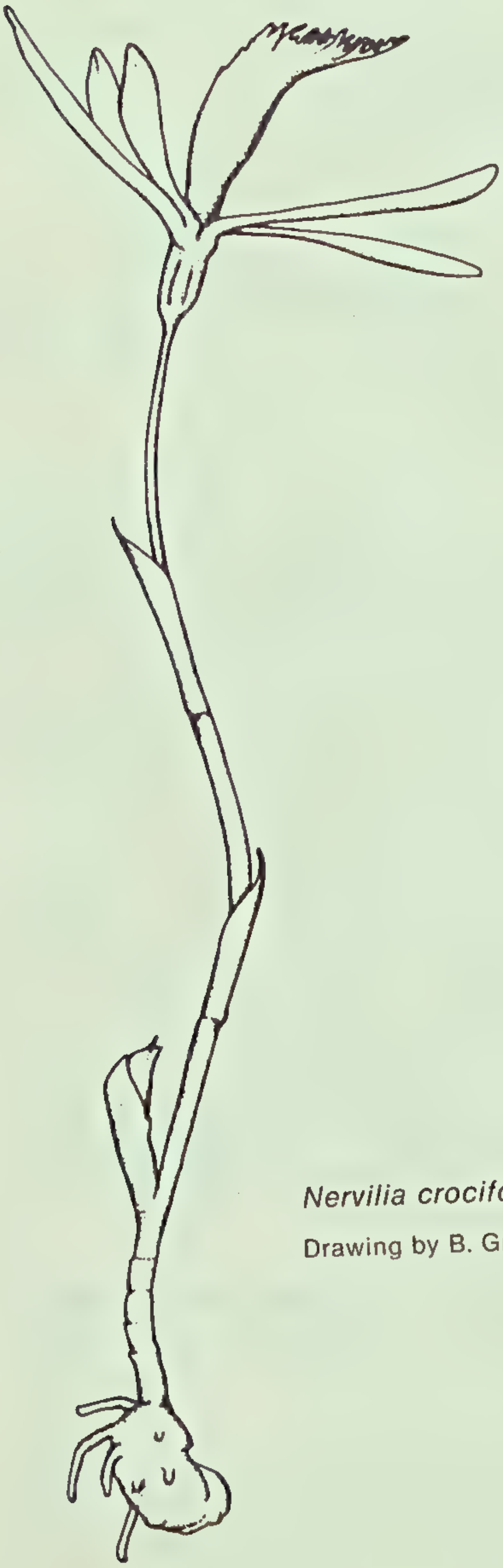

Nervilia crociformis

Drawing by B. Gray.

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In pursuance of A.N.O.S. Council's conservation policy we try to ensure that all of our advertisers are properly licensed to sell native orchids according to the relevant legislation.

OBITUARY

Eric Gifford Gordon — 8/9/84 to 31/8/85

It is with deepest regret we note the passing of Eric Gifford Gordon.

Eric was, over the years, involved in many interests, including photography, rifle shooting, car and bike racing, speedboats, to name a few. He was a member of many clubs and was active in business until 85 years of age when he decided to retire. He was married to Maisie Lesley, only child of a London theatrical family, who died just recently (11th July, 1985). He was a foundation member, councillor, vice president, president and life member of A.N.O.S. He was involved with the Stoney Range Reserve at Dee Why and worked for many years at the National Herbarium. The wattle *Acacia brunioides* ssp. *gordonii* is named after him.

He was an active field naturalist and studied botany and horticulture in his late 60's at the Ryde School of Horticulture. Eric was also an expert macro photographer and has donated many thousands of slides to the National Herbarium. Many other slides have been used in flora works. He was also a keen orchid publication collector and had an extensive collection.

He was a member of the Ira Butler Trophy Committee both as Past President and ANOS member. He was a trustee of the Stanley Smith Scientific Publication Fund from 1967 until his death. He was involved as ANOS Co-ordinator for the 6th World Orchid Conference held in Sydney in 1969, and was Co-editor of Australian Sarcanthinae by A.W. Dockrill, and co-editor of the ANOS paper on Australian native orchids presented at the 5th World Orchid Conference held in Los Angeles in 1967.

Those who knew Eric over the years will be saddened by his death, but will remember the enrichment that he brought to their lives by his knowledge and involvement. He was a compassionate man and will be missed greatly.

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The Orchids of Norfolk Island

by P.S. Green

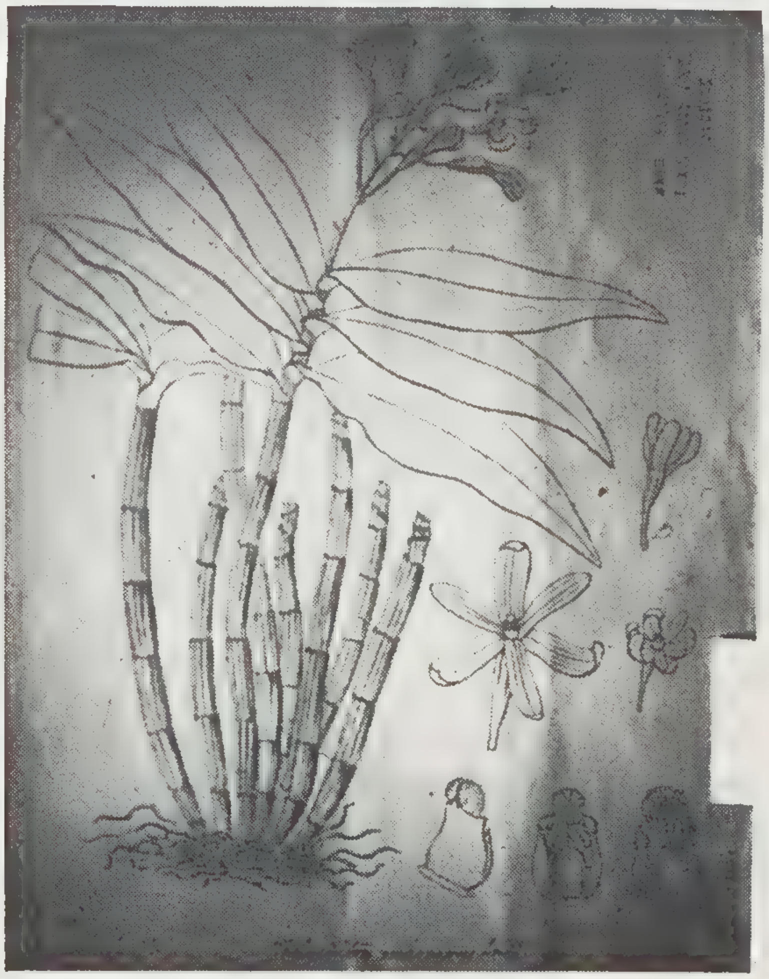
The orchids of Norfolk Island are little known and scarcely studied, yet they are of interest and significance because as early as 1833, the Austrian botanist Stephan Endlicher named and published descriptions of four of them (in his Prodromus Florae Norfolkieae).

The general reader may not immediately know where Norfolk Island is, and may associate it either with postage stamps, if a philatilist, or with the widely grown and popular Norfolk Island pine. The island, lying in the south west Pacific almost exactly midway between the northernmost tip of New Zealand and the southernmost point of New Caledonia is approximately 500 miles from land in either direction. It is slightly asymetrically pear-shaped and approximately 5 miles long by 4 miles wide. Being so isolated it is a true oceanic island, which in a phytogeographical context infers a flora (and fauna) marked by endemism, that is plants (and animals) native nowhere else in the world. In fact there are two endemic plant genera on Norfolk Island and about 40 species, four of which are orchids.

Early this year, in February, I was fortunate enough to revisit the island and observe the orchids in the wild to follow up studies that had been made on dried material deposited in the herbarium in the Royal Botanic Gardens, Kew and in the Naturhistorisches Museum in Vienna. These studies had been started by Mark Clements of the Australian National Botanic Garden, Canberra, during his recent stay at Kew. They are particularly crucial because they have included Endlicher's type specimens collected on Norfolk Island by the famous botanical artist Ferdinand Bauer in 1804 and above all, the original drawings made by Bauer, now housed in the Naturhistorisches Museum. The taxonomic and nomenclatural conclusions reached after this study are being published elsewhere, but it is thought that readers might like to learn a little of these interesting island plants, illustrated by one or two photographs taken in the field (see colour pages).

Dendrobium

Unfortunately no plants of *Dendrobium* were found in flower in February. Endlicher described two species, *D. macropus* (as *Thelychiton macropus*) and *D. brachypus* (as *T. brachypus*) and, although I did not see flowering specimens, Bauer had illustrated them both in detail, and together with Mark Clements I have studied these drawings. It is remarkable that in both cases the flowers are peloric (see illus. 1) and we have come to the conclusion that only one species is actually represented, *D. macropus*, having been based on a fully grown mature plant with longish pseudobulbs, and *D. brachypus* on younger material in which the cane-like pseudobulbs are still short and not fully developed (*macropus* means long footed and *brachypus* short footed). Furthermore it seems quite probable that these peloric flowered plants are cleistogamous, that is, they pollinate themselves without the normal full development of the flower, a condition also found, I am told, in some other Pacific island populations and that the whole population on Norfolk Island may be uniformly cleistogamous. This condition is of course abnormal and until 1971 botanical names based on such material could be ignored; however in that year, the article in the International Code of Botanical Nomenclature that outlawed names based on abnormalities was deleted from the



Illus. 1. *Dendrobium macropus* (Endl.) Reichb. f. Ferdinand Bauer drawing of the type collection at Vienna.

Code with the result that *D. macropus* and *D. brachypus* have now to be accepted as legitimate names. This has had its consequences, for if one studies *Dendrobium* across the whole south west Pacific and Australia it is apparent that two or three named and described taxa from this area belong to this same species including the Australian orchid which has been known as *D. gracilicaule* — also known on New Caledonia, and as separate varieties on Lord Howe Island and Fiji. It has been decided to sink *D. brachypus* as a synonym of *D. macropus* and so we have subsp. *macropus* from Norfolk Island, subsp. *gracilicaule* from coastal New South Wales and southern Queensland, and subsp. *howeanum* from Lord Howe Island (and elsewhere in the south west Pacific).

Bulbophyllum

Bulbophyllum is represented by one species on Norfolk Island and is a much rarer plant than *Dendrobium macropus*; it seems to occur most frequently, where it does occur, as an epiphyte on the santalaceous tree *Exocarpos phyllanthoides*. Endlicher called it *Thelychiton argyropus* but it was correctly transferred to *Bulbophyllum* by Reichenbach in 1876. Although Bauer also drew this species and his drawings are in Vienna I was anxious to see the flowers myself. It was not in flower on Norfolk Island in February, but after obtaining the necessary permits I was able to fly a plant back to Kew where it has settled down and, it is hoped, will flower. The slightly depressed-conic pseudobulbs are very similar to those of the *Bulbophyllum* from Lord Howe Island and of that recently recorded from the MacPherson Range on the Queensland-New South Wales border (Orchadian 6: 136 1979) both of which have been incorrectly called *B. tuberculatum* (a New Zealand endemic with quite differently shaped pseudobulbs). In fact this *Bulbophyllum* from Lord Howe Island, which is believed to be the same species as that from Norfolk Island, flowered at Kew three months after its arrival (Fig. 1, Colour pages).

Oberonia

Endlicher described a diminutive epiphytic orchid as *Titania miniata* which Lindley transferred to his new genus *Oberonia* in 1859 as *O. titania* (devotees of Shakespeare's 'A Midsummer Night's Dream', please note!). The numerous but minute flowers, about 2 mm. across, are individually terra-cotta red and translucent white, but being so small they scarcely endow the plants with horticultural merit (Figs. 2 & 3). This species has been confused with the Australian *O. palmicola*, which is a different plant.

Phreatia

As *Plexaure limenophylax*, Endlicher described a small representative of this genus, using Bauer's drawing to aid him. Today it is a rare endemic in danger of extinction. I saw only two small plants, both in cultivation in gardens on the island and both in a vegetative state. However, those who collect stamps may see a representative of it on the 3c. stamp in the recently issued definitive series of flora stamps issued on Norfolk Island (Illus. 2). Unfortunately, by some error it has been named *crassiuscula* on the stamp, a different species, known from Queensland. (Incidentally, the $3 stamp in the same series depicts *Oberonia titania*.)

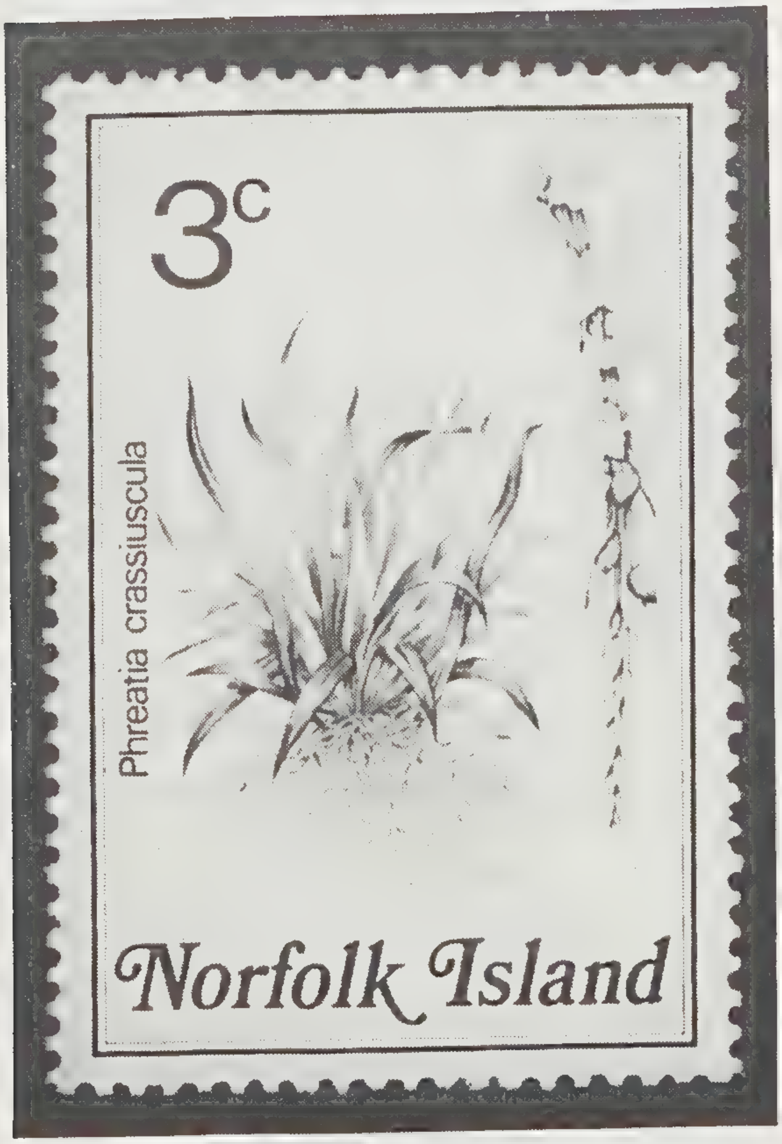
Another species of *Phreatia* occurs on the island too, and is less rare. It is *P. tahitensis*. When it arrived on the island is not known; neither Bauer nor Backhouse (in 1836) found it and it is not recorded in Laing's "Revised List of the Norfolk Island Flora" of 1915 (Trans & Proc. New Zeal. Inst. 47: 1-39). The first specimen at Kew was collected by Captain McComish as recently as 1939. Today it is reasonably frequent, especially epiphytic on *Dysoxylum patersonianum*, often with *Dendrobium* and *Oberonia*. It is a much larger species with distinctly rounded pseudobulbs and long pendulous spikes of small white flowers (Figs. 4 & 5).

Taeniophyllum

The most recently discovered orchid on Norfolk Island is also the smallest of them all. It was first found in 1967 during the survey by Professor John Turner of Melbourne University and others which led to the Australian Conservation Foundation's Special Publication "The Conservation of Norfolk Island" (1968). It was found epiphytic on the Norfolk Island pine, *Araucaria heterophylla*, where it grows on the undersides of the branches. It was identified as *T. muelleri*, an Australian species, but further collections have shown that it is not this species after all and it may represent an undescribed one. But better flowering material is needed to settle this. Sufficient to say that the whole plant is only 1 to 2 inches across and that like all members of the genus it produces no leaves but carries out its photosynthesis by means of chlorophyll in its roots (Fig. 6).

Tropidia viridi-fusca

This ground orchid, otherwise only known from New Caledonia, its type locality, was also first recorded relatively recently but had probably been overlooked. As a ground orchid it occurs in damp forest and in most years is a shy flowerer — I searched in vain in the best known locality within the National Park perhaps a week or two too early in February, and although one got ones "eye in" to distinguish the orchid from the very similar looking seedlings of the native palm *Rhopalostylis baueri* not one was seen in flower. The late Mrs Pat Ralston who sent in specimens in 1966 described the flowers as opening at about 10.30-11 a.m., closing about 4 p.m. and not reopening the next day. She said the three outer tepals were "green with splotches of black" and the centre tepal "blackish and crinkled". The centre of the flowers were said to be creamy-white with a splotch of yellow and to have a distinct and highly unpleasant odour.



Illus. 2. *Phreatia limenophylax* (Endl.) Benth. as depicted on the 3c. stamp, Norfolk Island.

Illus. 3. *Oberonia titania* Lindl. on a trunk of Dysoxylum patersonianum, with *Dendrobium macropus* and *Pyrrosia confluens*, Norfolk Island.

Microtis

Finally, one other ground orchid has been found on Norfolk Island. *M. unifolia.* It is not very common but is found occasionaly in open habitats. It has, however, a wide distribution from Lord Howe Island, Australia and New Zealand to the Kermadec Islands, New Caledonia and Vanuatu.

Honorary Research Associate
Royal Botanic Gardens
Kew, Richmond
Surrey

Editor's Footnote: Mr. Green has been asked to write the Flora of Norfolk Island and of Lord Howe Island for the Bureau of Flora and Fauna, Canberra.

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Philip Spence of 'Orchid Productions', goes back a long way as a practical seedling raiser, from the days when he and Margaret used a pressure cooker in the kitchen, to his present modern laboratory and his seedlings are present in most local collections. In recent years he has been following his own breeding lines and the "Aussie" trademark is becoming common in the hybrid registrations.

Les Nesbitt, of South Australia, has Australia's only commercial terrestrial nursery, this growing from his early efforts to preserve terrestrials doomed by development, to the stage where Les now has a very large range of tubers or green plants on offer and his efforts are reflected by the number of terrestrials around Australia which originated at Nesbitt's.

Wal Upton, of 'Double U Orchids', needs very little introduction for his involvement in Native orchids precedes the formation of A.N.O.S. — indeed Wal was one of the Founding Fathers. In those days a "true blue" amateur with a gift for botanical drawing, Wal — and Jill, the other part of Double U Orchids — has been a pioneer breeder of Australian Hybrids, and plants from his breeding are very well known indeed.

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Ken Russell for many years hid himself up in Dungog but the past few years fame has sought him out and his work with *Sarcochilus* is now well known — also is a pioneer in line breeding species, and some of his recently flowered seedlings are far superior to the average forest collected clones. Soon no one will bother chasing such plants when much superior flowers are available for a few dollars.

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Don Jones, of 'Yarrabin Orchids', is another old-timer in the orchid world and carries a large and varied stock, including a wide range of Native species and Hybrids and the Yarrabin label is well known throughout Australia — though soon Don's visitors will have to travel a bit past Pennant Hills — he and Joan are moving camp up Wyong way.

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Monstrosities amongst Tropical Australian Orchids

by A.W. Dockrill

Questions about the incidence of teratologic forms (monstrosities) amongst tropical orchids are often asked. The present short paper makes no claims to be a learned discourse on such or prepound any theories about them. Also it is not concerned with the odd monstrosity that from time to time shows up (this occurs in any group of plants or animals, even humans, the old adage "these things are likely to turn up in any well regulated family" is a truism), but with those species which, in Australia at least, are represented by a relatively large percentage, even to 100% in a few instances, of teratologic individuals. An exhaustive investigation into their occurrence has not been made so it is likely that the list of species mentioned here is far from exhaustive. This paper is presented merely in the hope that it will spark off an interest in these plants. As most monstrosities are unable to reproduce their kind, why is it in some instances not only **are** they able to do this but become a large proportion of the population?

The contention that major deviations occur in response to a change in environment is sometimes voiced or written, but it is difficult to believe this. A plant can respond to changes in environment, light and nutrition by better or worse growth or flowering but hardly by consciously producing a change in morphology. It would **seem** that most of these teratologic forms reproduce because they are self-pollinating but this is not always the case, e.g. *Dendrobium tozerensis* Lavarack. It would seem that the "regular" form has not been able to survive in instances where the overall population is teratologic because its natural pollinators are no longer present or are in a modified unsuitable form. However, many questions are posed and it is hoped that the challenge will be taken up.

The species fall naturally into three groups: a. those in which only a proportion of the population is teratologic; b. those in which apparently only the Australian representatives are teratologic; c. those only known as what must surely be teratologic as they are a gross departure from the generally accepted norm of the genus or even family.

Examples of the three groups that readily come to mind are:—

(a) *Habenaria xanthantha* F. Muell. with the departure from the norm being the form that was described as *Habenaria anomala* Dockr. in which the labellum is petaloid (other variations also occur).

(b) *Thelasis carinata* Bl. and *Eulophia pulchra* (Thou.) Lindl. in which all known Australian representatives are self-pollinating and the flower structure a gross departure from the norm occurring overseas yet their plant form etc. leave little doubt that they are the species indicated.

(c) *Dendrobium tozerensis* Lavarack in which all known specimens have three anthers per column.

Aphyllorchis anomala Dockr. which has a more or less petaloid labellum and, apparently, is self-fertilizing and the thought is prompted that it might be a teratologic form of *Aphyllorchis queenslandica* Dockr. The view has been expressed that it might represent another genus and although this is a possibility, it is unlikely.

Phaius australis F. Muell. (var. *australis* at least) which seems to be self-fertilizing and some specimens produce flowers that never open, supplementary anthers are often produced and the general structure of the pollinia, anther bed, etc., are a gross departure from the norm of the genus; here again the thought is prompted that this might possibly be a teratologic form of *Phaius tancarvilliae* (Banks) Bl.

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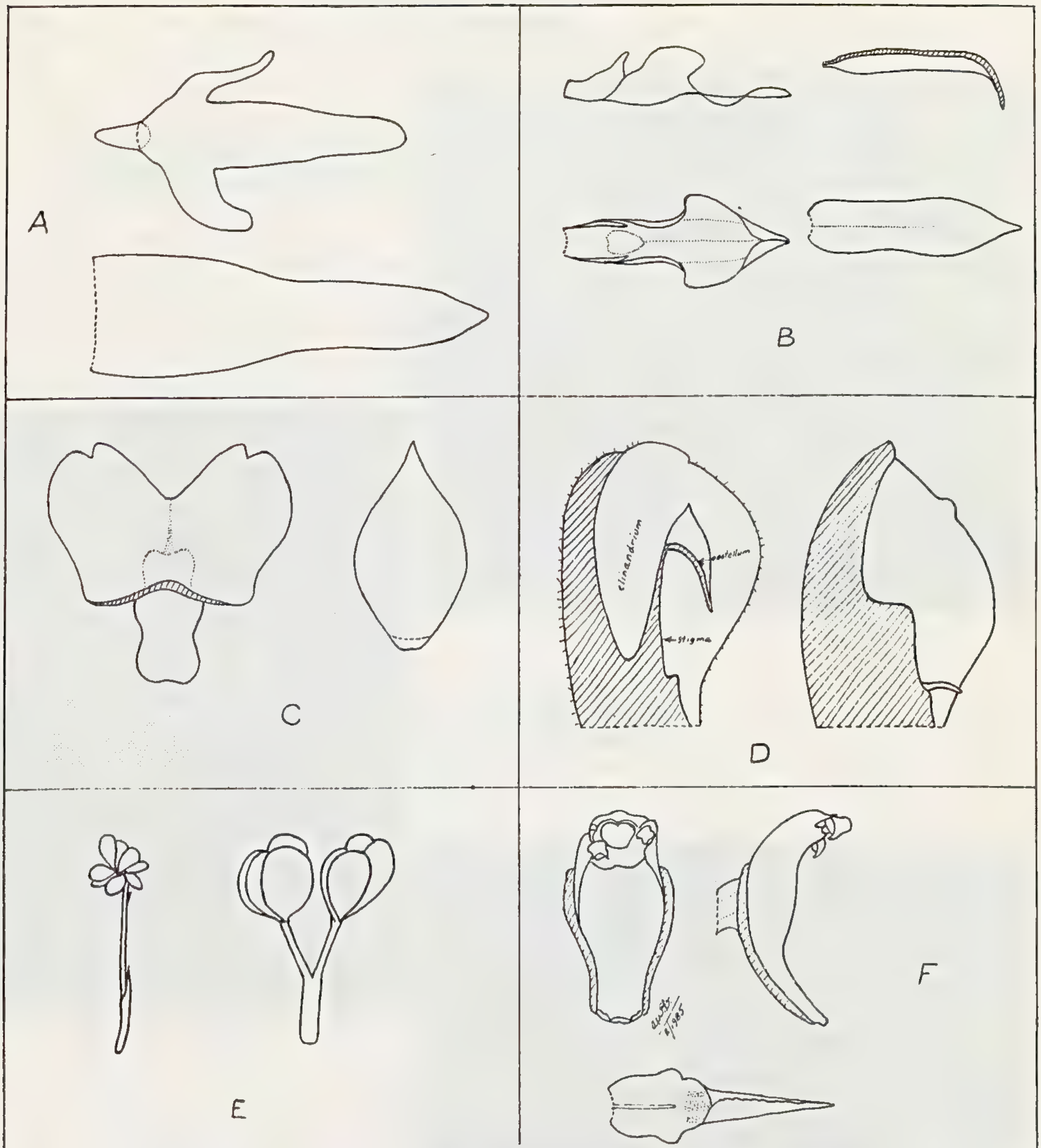


a. ***Habenaria xanthantha*** F. Muell. labellum flattened out of type form (top and teratologic form (bottom).

b. (Left — ***Aphyllorchis queenslandica*** Dockr., top — labellum from the side; bottom, labellum from above.
(Right — ***Aphyllorchis anomala*** Dockr., top — median longitudinal section of labellum; bottom — labellum flattened out.

c. ***Eulophia pulchra*** (Thouars) Lindley, flattened out labella — Left, typical form; right — teratologic (Australian) form.

d. (Left — ***Phaius tancarvilliae*** (Banks) Blume) median longitudinal
(Right — ***Phaius australis*** F. Muell.) section of columns.

e. ***Thelasis carinata*** Blume — Pollinaria — Left — typical form (taken from Holttum); Right — Australian form (taken from D.L. Jones)

f. ***Dendrobium tozerensis*** Lavarack — Column from the front and side and labellum from above.

* All figures variously enlarged.

The Orchids of Norfolk Island

P.S. Green

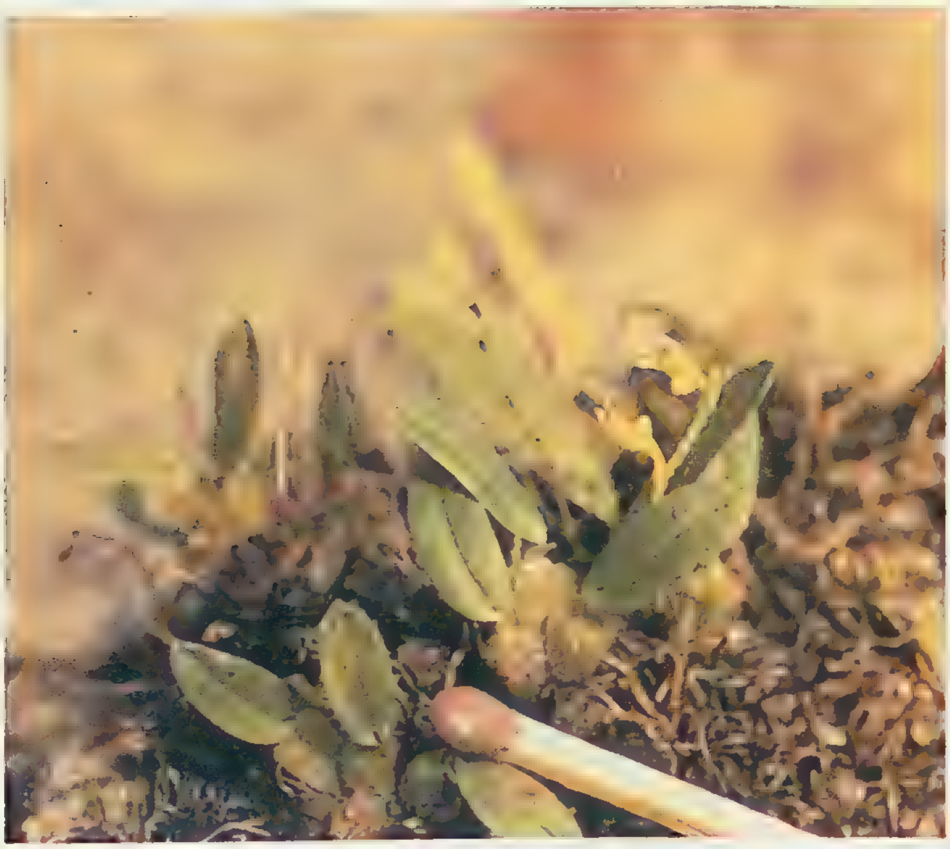


Fig 1. *Bulbophyllum argyropus* (Endl.) Reichb.f. Flowering at Kew, collected on Lord Howe Island, P.S. Green 2375.

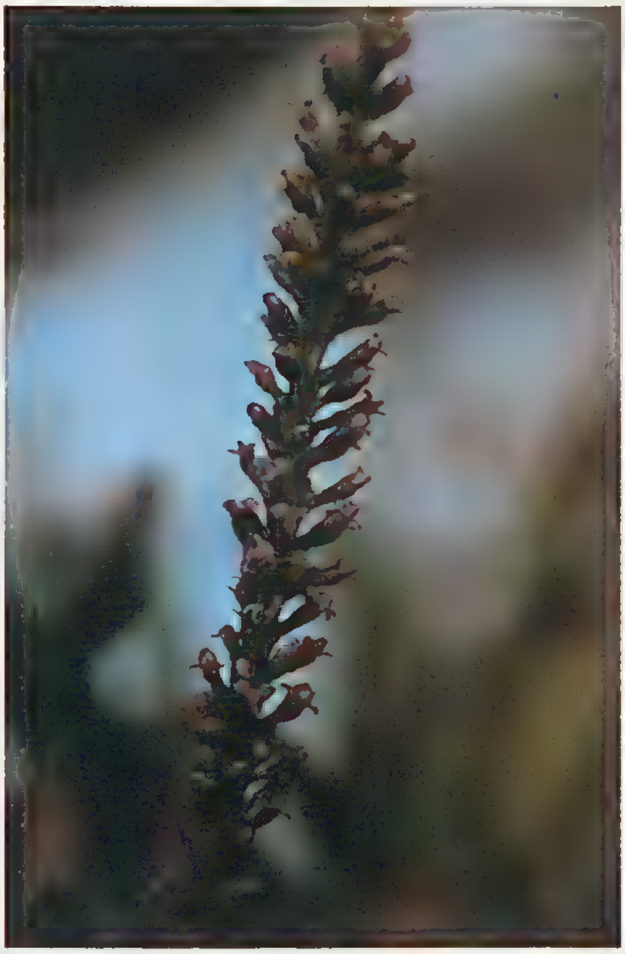


Fig 2. *Oberonia titania* Lindl., part of flower spike, Norfolk Island.

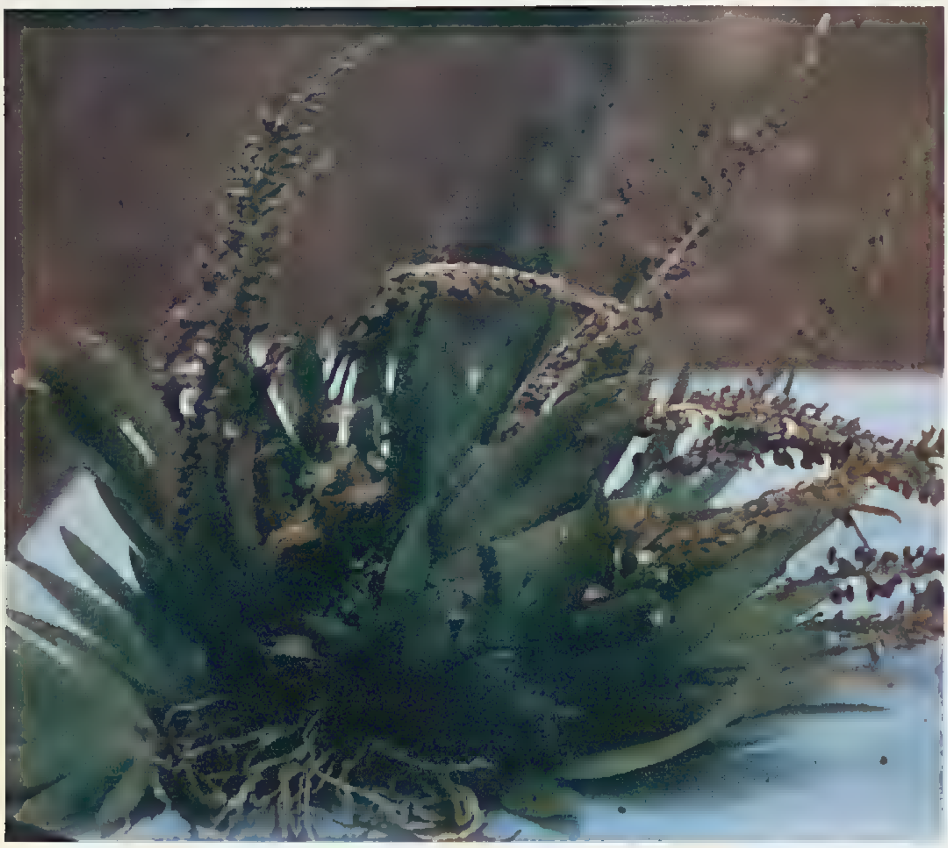


Fig 3. *Oberonia titania* Lindl., in flower and fruit. Norfolk Island.

The Orchids of Norfolk Island

P.S. Green

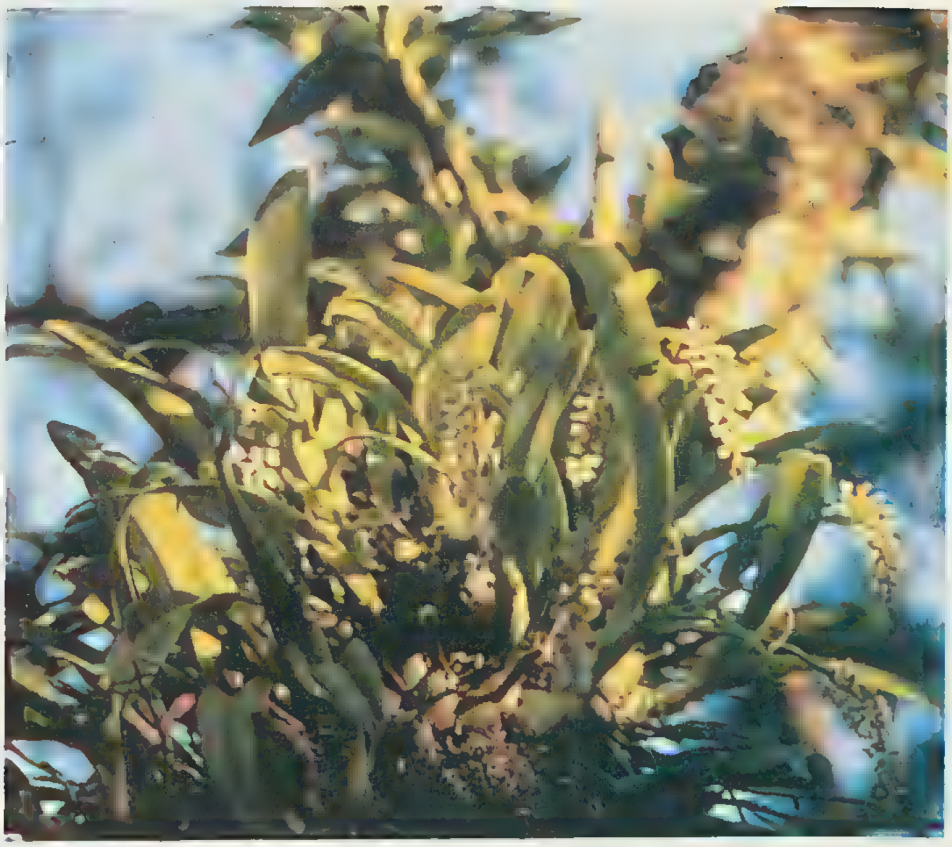


Fig 4. *Phreatia tahitensis* Lindl., epiphytic on *Dysoxylum patersonianum*, Norfolk Island.

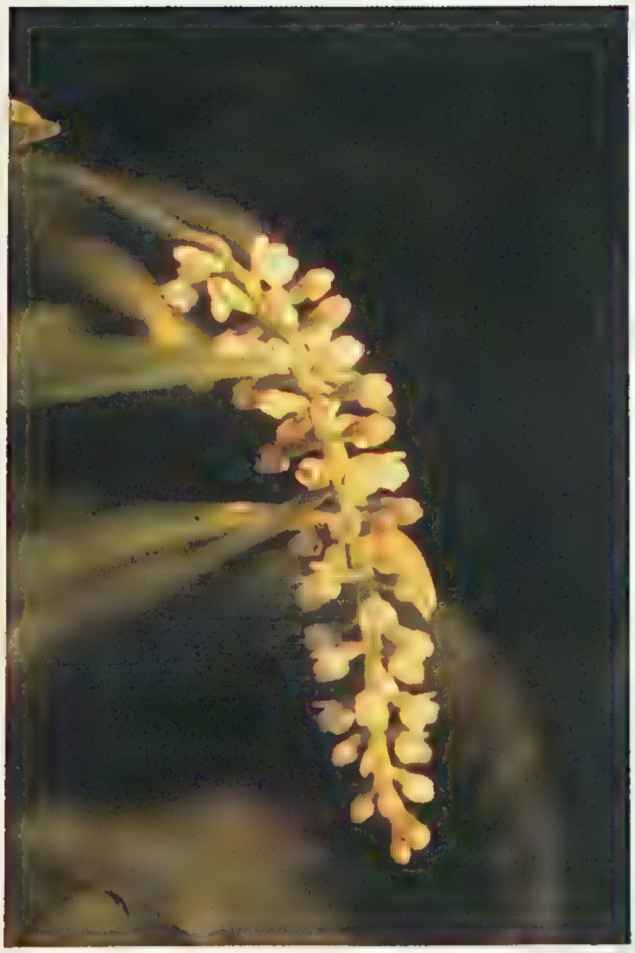


Fig 5. *Phreatia tahitensis* Lindl., inflorescence, Norfolk Island.

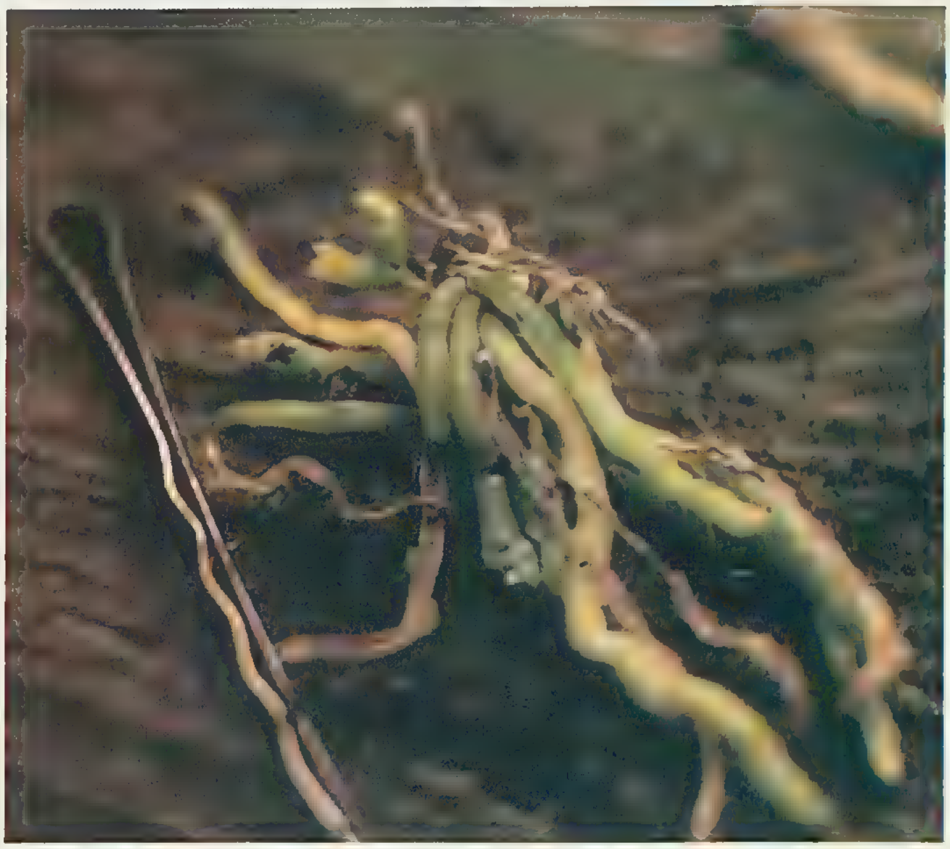


Fig 6. *Taeniophyllum* sp., epiphytic on *Araucaria heterophylla*, the Norfolk Island Pine, Norfolk Island.

Miscellaneous Notes on the Orchids of North-Eastern Queensland

2. *Corybas neocaledonicus, Nervilia crociformis* Two New Orchids Recorded

by B. Gray and D.L. Jones

Summary

This paper records two orchids from Australia for the first time. The species are *Corybas neocaledonicus* (Schltr) Schltr and *Nervilia crociformis* (Zoll. & Mor.) Seidenf. Descriptions of each have been prepared based on Australian material. Specimens are lodged at the Division of Forest Research Herbarium, CSIRO, Atherton.

Corybas neocaledonicus (Schltr) Schltr in Repert. Spec. Nov. Regni. Veg. **19** : 23 (1923). Syn: *Corysanthes neocaledonica* Schltr., Bot. Jahb. **39** : 47 (1906). Type Schlecter 14918.

Description:

Leaf 12-25 mm x 10-14 mm, cordate to orbicular, apiculate, purplish on the underside. Flower 10-12 mm long, deep maroon, dominated by the dorsal sepal and labellum, on a peduncle about 1 mm long. Ovary 4-5 mm long, subtended by a linear bract about 3 mm long. Dorsal sepal 15-20 mm x 6-8 mm when flattened out, dark maroon with 6-8 longitudinal striations, spathulate-oblong, strongly curved throughout, the apex with a small point which may be upcurved, the surface rugose. Petals about 1 mm x 0.4 mm, falcate, green, blunt, widest at the base. Lateral sepals 1.5-1.8 mm x 0.4 mm, linear, free, green, tapered from base to extremity, apex entire. Labellum much shorter than dorsal sepal, white; labellum-tube about 3 mm long, erect then curving sharply and expanded into an obovate lamina; lamina 5-7 mm x 5-7 mm, cordate, the anterior margins strongly recurved, white with conspicuous striations, markedly papillate, the margins entire or minutely hispid to denticulate; boss sunken, or notched; callus thickened, especially near the junction of the tube and the lamina, the surface slightly wrinkled; auricles about 1.3 mm long, directed downward, hollow, with no opening, tapered. Column about 2.5 mm long, erect, broadest at the base, minutely winged. Stigma about 1 mm across, rectangular, concave. Anther about 1 mm long, blunt, entire. Pollinarium about 0.8 mm x 0.4 mm, consisting of 4 pollinia in 2 pairs, attached directly to an oblong viscidium 0.5 mm long. Pollinia oblong, mealy.

Locality Details

Cook District; TR 176 Monkhouse (Mt. Leswell), 30K South of Cooktown 15 45′, 145 15′, alt. 400m. Two Collections: B. Gray 3092 (7/9/1982), B. Gray 3377 (17/6/1984).

Habitat

In Australia, *C. neocaledonicus* was found on an exposed granite ridge under grass trees, casuarina and banksia. It was growing in a single large colony (estimated to be 100m x 200m) with a tendency for the plants to congregate in the shelter of the grass trees. The soil was sandy and the surrounding vegetation has been described as wet sclerophyll forest.

Notes and Discussion

Corybas neocaledonicus was described from material collected in New Caledonia and this is the first record of the species from Australia. The Australian material is a very good match for MacKee 12501 which is figured in plate 171, Halle (1977).

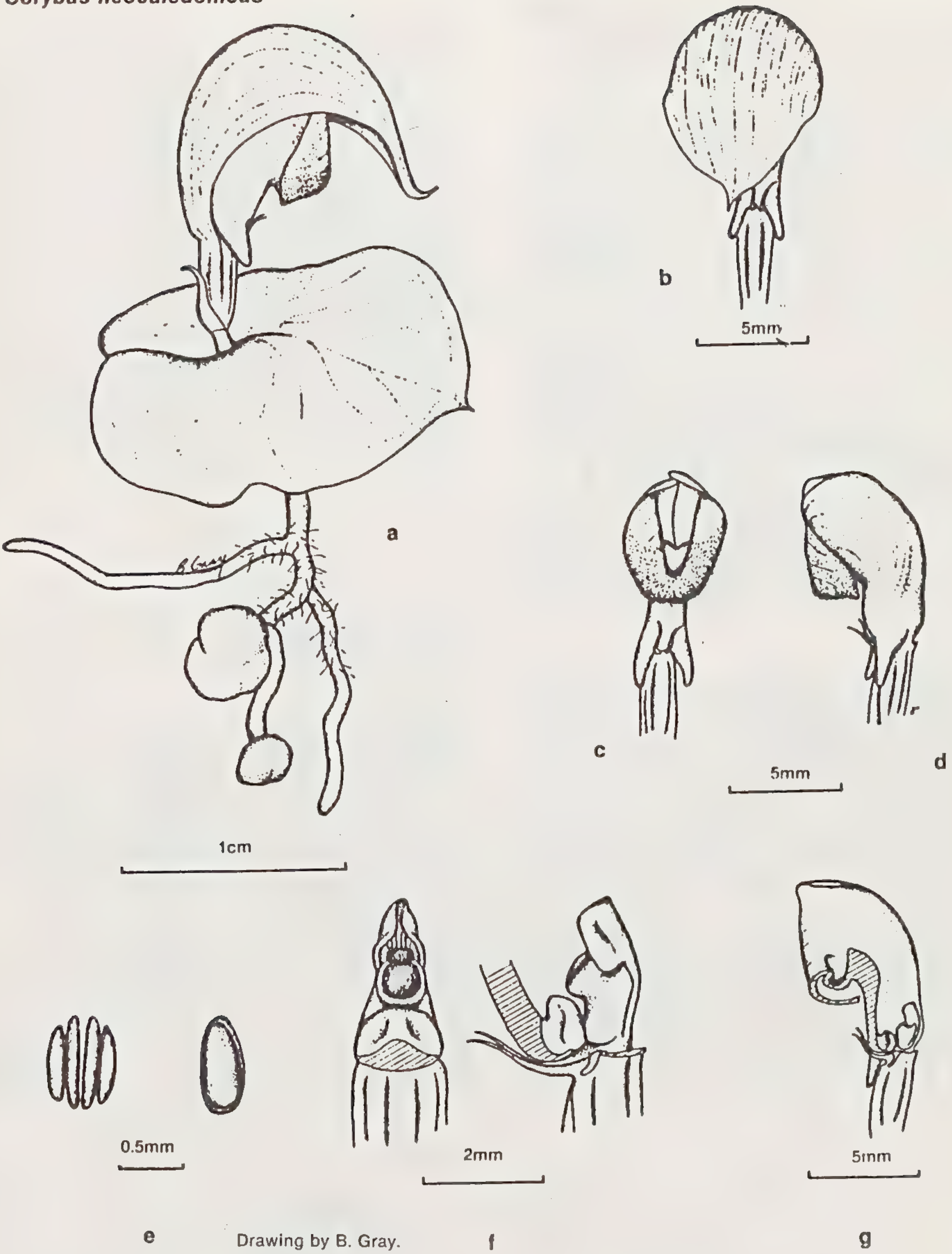
In Australia *C. neocaledonicus* has as its closest congener *C. aconitiflorus* Salisb. The two species are very closely related and *C. neocaledonicus* can only be distinguished by its much smaller flower with a deep maroon dorsal sepal. Further investigations will be carried out on the relationships between these two species. *C. neocaledonicus* is also superficially similar to *C. abellianus* Dockr. but this species has even smaller flowers with a pronounced nodding habit and the lobes of the labellum do not curl back.

Nervilia crociformis (Zoll. & Mor.) Seidenf., Orchid Genera in Thailand, VI, Dansk. Bot. Arkiv, bd. 32, hft. 2, 151 1978.
Syn. *Bolborchis crociformis* Zoll. & Mor. in Moritzi, Syst. Verz, Pl. Zoll 89 (1846); *Pogonia crispata* Bl. Mus. Bot. Lugd. Bat. **1** : 32 (1949; *Nervilia crispata* (Bl.) Schltr ex Kranzlin, in Schum & Lauterb. Nachtr. 82 (1905).

Description:

Tubers 1-2 cm x 0.8-1.2 cm, globular to ovoid, bearing many short rootlets. Leaf prostrate, 4-7 cm across, orbicular, dull greyish-green, with about 10 adiating veins, the margin scalloped between the veins. Inflorescence 5-8 cm tall,

Corybas neocaledonicus



Drawing by B. Gray.

Corybas neocaledonicus

a. flowering plant
b. flower from plant
c. flower from front, dorsal sepal removed
d. flower from side, dorsal sepal removed
e. pollinia from above and side
f. column from front and side
g. section through labellum showing position of column

fleshy, bearing 1-3 lanceolate sheathing bracts, elongating after fertilization. Flower solitary, about 2 cm across, widely expanding, green with a white labellum. Dorsal sepal 15-18 mm x 3-4 mm, obovate to spathulate, the apex acuminate, held obliquely erect. Lateral sepals 15-18 mm x 3-4 mm, obovate to spathulate, bluntly pointed, spreading. Petals 13-15 mm x 2-3 mm, linear-lanceolate, falcate, somewhat incurved. Labellum 13-15 mm x 7-8 mm, obovate when flattened, white, trilobed, the lateral lobes erect, the margins crisped and ending in many linear lobes, the mid-lobe relatively short, decurved, apiculate, the margins entire or with a few linear lobes; callus extending over most of the central part of the labellum in rough lines to near the apex, the basal part consisting mainly of hairs, the proximal part a mixture of hairs and short papillae. Column about 10 mm x 3 mm, linear, a gibbous hump behind the anther, erect and closely embraced by the labellum. Anther cap about 2.5 mm x 2.5 mm, hinged at the back. Stigma about 2 cm across, cordate or crescent-shaped, sunken. Rostellum about 0.5 mm across, prominent, white. Pollinia about 1.8 mm long, semi-circular, coarsely granular.

Locality Details

Cook District; NPR 8, Parish of Wymouth, 12 40′, 143 21′, alt. 40 m, B. Gray 2413, 24/1/1982; Cook District, Adjacent to Iron Range Airport, 12 47′, 143 18′, alt 20 m, B. Gray 2882, 14/12/1982; Cook District; NPR 8, Parish of Weymouth, 12 37′, 143 21′, alt 80 m., B. Gray 2407, 21/1/1982, sterile; Cook District; Claudie River, 12 43′, 143 17′, alt. 20 m., B. Gray 2879, 11/12/1982, rainforest margin, flowering.

Habitat

In Australia, *N. crociformis* has been found along the edges of rainforests and deciduous vine thickets, sometimes extending into the forest itself. It grows in fairly large loose colonies with the flowers appearing before the leaves and soon after the first heavy rains of the wet season.

Notes and Discussion

N. crociformis occurs in Java, Krakatau, the Philippines and New Guinea. It has also been reported from Samoa and New Caledonia by Schlecter (Seidenfeiden 1978) but is not listed from New Caledonia by Halle, 1977. It was previously well known as *N. crispata* (Bl.) Schltr until Seidenfaden recently investigated the type of *Bolborchis crociformis* and found the two to be identical. The Australian material is a very good match for the figure depicted in his work (Seidenfaden 1978).

N. crociformis can be easily distinguished from other Australian species of *Nervilia* by the crisped labellum with lobed distal margins and a prominent callus consisting of hairs and short papillae. The leaf is prostrate (as in *N. discolor* (Bl.) Schltr.) but has fewer radiating veins than that species and is glabrous on both surfaces.

Acknowledgements

We thank Barbara Jones for typing the manuscript.

References

Dockrill, A.W. (1955), A new *Corybas* from northern Queensland, N. Qld Nat. 24, 112 (1955).

Dockrill, A.W. (1969), Australian Indigenous Orchids, Vol 1, Society For Growing Australian Plants, Halstead Press, Sydney.

Halle, N. (1977), Flora de la Nouvelle Caledonie, 8, Orchidacees.

Seidenfaden, G. (1978), Orchid Genera in Thailand, VI, Dansk. Bot. Ark. 32 (2): 151 (1978).

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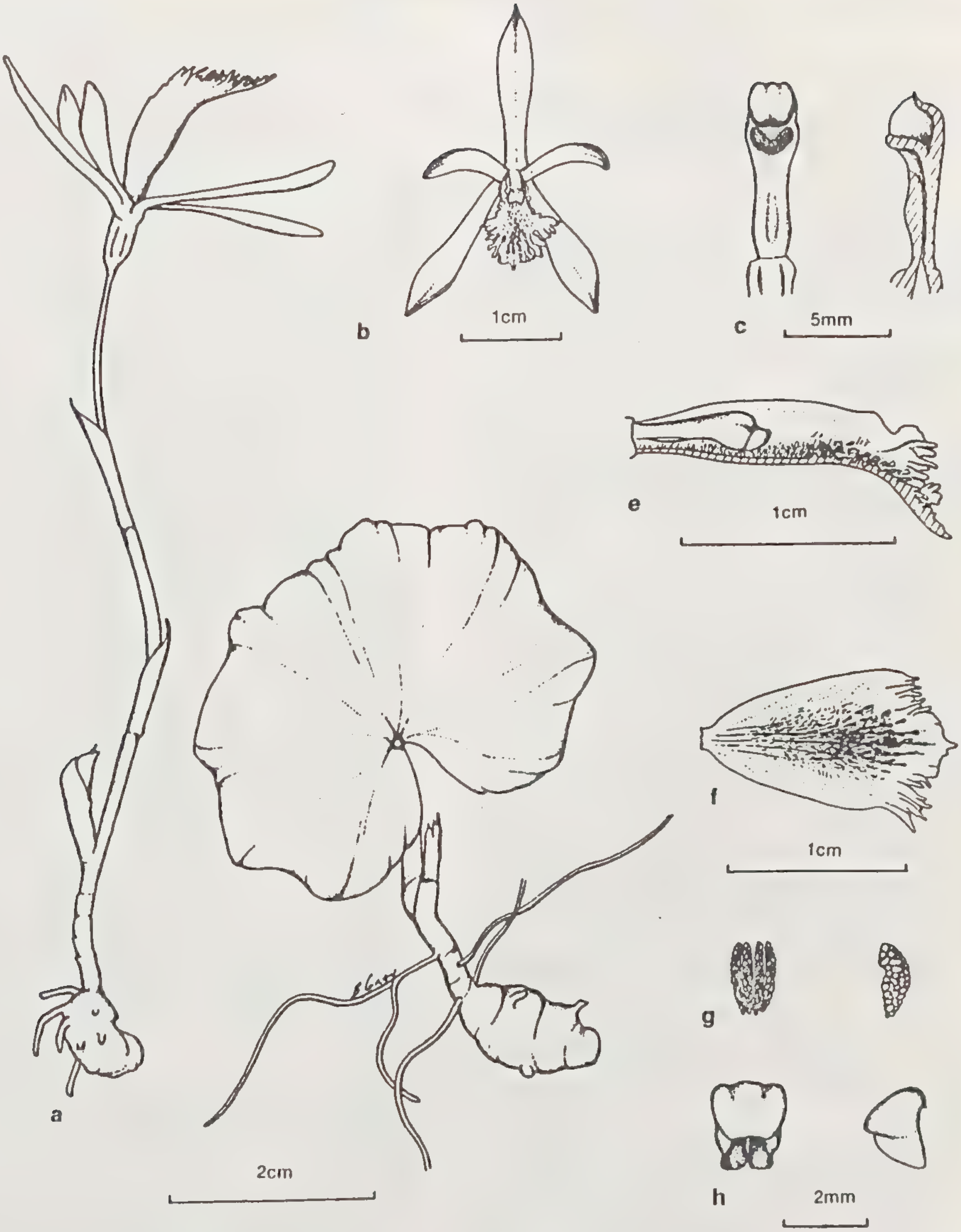
4 June, 1985

Nervilia crociformis



a. plants in flower and leaf
b. flower from front
c. column from front
d. section through column
e. section through labellum showing column
f. labellum flattened out
g. pollinia from above and side
h. anther cap from above and side

Drawing by B. Gray.

Dishonesty and Deceit in the Pollination of Australian Orchids

by R. Bates

From an anthropomorphic viewpoint, the pollination strategies of many Australian orchids could be considered deceitful, dishonest and even immoral (or is it amoral?). This is particularly true of the temperate terrestrials.

The classic case of deceit is the orchid which lures male insects using a chemical copy of the female insect's sexual attractant perfume, then persuades the hapless wasp or ant to attempt copulation with the flower and to complete the insult, unceremoniously sticks it with a set of pollinia anywhere from between the eyes to the genitalia!

With *Cryptostylis* the insect is a male ichneumon wasp which, while grasping the labellum from underneath, probes the column with its genitalia, sometimes releasing semen and usually collecting the pollinia on its "tail"! (Coleman 1929). In *Calochilus* the insect is a scollid wasp which attempts to copulate with the labellum and receives pollinia on its head. *Calochilus* flowers have a hairy labellum with two eye-like calli at the base. Thus the labellum serves as a copy of the hairy female scollid and represents a decoy insect! (Jones & Gray 1974). In *Arthrochilus, Drakea* and *Spiculea* the insects are male thynnid wasps which attempt to carry off the decoy female and flip themselves into the column in the attempt, collecting pollinia on the thorax. (Female thynnid wasps are usually wingless — the males pick them up and mate on the wing.) (Stoutamire 1975.) In *Leporella* the insect is a winged male ant (*Myrmecia*) which attempts to copulate with the velvety labellum: a unique example for anywhere in the world, of ants being sexually attracted to flowers! (Bates 1979, Peakall 1985.)

These are just a few examples of how Australian orchids lure insects with false promises of sexual fulfilment. There are however many other orchids which practise deceit in other forms.

Some orchids pretend to have lots of goodies for the insects to eat. In the case of brightly coloured and perfumed species, their colour and fragrance signal that they offer a good reward — either nectar or pollen. In fact most of them have nothing to offer; they simply mimic the pretty bush flowers around them which do provide food! (Van der Pijl & Dodson 1966.) Some carry this mimicry further. *Diuris longifolia* and *D. maculata,* the donkey orchids, have evolved some general characteristics of pea flowers so that bees which use the bush peas as food flowers might visit the orchid by mistake and instead of getting food, have orchid pollinia stuck rudely on their head. (Beardsell & Bernhardt 1982). Others pretend to have pollen available and produce yellow appendages of various forms. In bee pollinated *Caladenia* these are the yellow tipped labellum calli; in *Glossodia* anther like appendages at the labellum foot and in *Gastrodia* epidermal cells are sloughed off the yellow labellum and bees may actually eat these (Jones 1981). St Vogel (1978) notes that pseudopollen is very common in orchids, especially on the labellum. Curiously, he cites *Thelymitra crinita* as an example but of course the "pseudopollen" of *Thelymitra* flowers is not on the labellum but on the column with its yellow top, stamen-like appendages or post-anther lobe. The bees, already falsely lured by the bright colours and perfumes of the *Thelymitra* flowers, land on the column and begin chewing the column appendages, meanwhile treading all over the real orchid pollinia and collecting it on their hairy undersides.

Other orchids pretend to offer nectar and have shiny yellow-green areas on the column or base of labellum. *Dipodium* is an arch offender here; its attractive flowers advertise from a distance like a neon sign flashing the message, "Fast Food: take-away or eat here". Once attracted, the native bees note a shiny yellow patch on the column just below the stigma — the feeding trough. Unfortunately it is empty and the bee pushes further under the column but as there is no nectar here either, it gives up and backs up ready to fly away. Adding to the indignity of it all, the little round balls of pollinia are jammed onto its head and the bee flies off not knowing the full irony of the situation; *Dipodium punctatum* does have nectaries, not on the flowers but on the scape at the base of each floral bract! Why there? This is to protect the flowers from ants which are kept busy by the extra-floral nectaries and ignore the flowers from which they might otherwise steal the pollinia. Very devious, but it works very nicely. (Bates 1985).

Orchid treatment of its insect pollinators is really quite undignified. Some *Pterostylis* for example, with their hair-trigger labellum roughly hurl any visiting insect (usually fungus flies) into the prison which is the orchid galea and the insect must collect the pollinia as it crawls up to the light provided by the windows at the top of the galea and escape. Then there are the helmet orchids, the *Corybas,* which look like little toadstools and entice female fungus flies looking for a cosy nursery in which to lay their eggs. Other orchids provide all sorts of misleading odours — these may be the fruity scents of miniature *Prasophyllum* which entice tiny fruit flies and of course *Acianthus* and *Liparis* have less pleasant, even foul odours to attract flies which like that sort of thing!

The prefix "pseudo", meaning **false,** seems to feature in many papers dealing with the pollination of Australian terrestrial orchids: there are the pseudo-pheromones or copies of odours produced by insects to send messages to their mates i.e. in *Caladenia* (Stoutamire 1983); there are pseudo-insects i.e. the wasp-like decoy on the labellum of *Chiloglottis formicifera,* and when an insect attracted by pseudo-pheromones attempts to mate with the pseudo-insect, this is called pseudo-copulation (van der Pijl & Dodson 1966). We have already mentioned pseudo-pollen, pseudo-nectaries and pseudo-stamens and van der Pijl & Dodson even suspected pseudo-parasitism in *Calochilus* where they thought that female wasps may have tried to lay their eggs on the hairy labellum after mistaking it for a woolly caterpillar! All this goes to show that orchid flowers are pretty good mimics. I am glad that "donkey orchids" aren't many times larger or they may make asses of certain well-known equines.

Mimicry and floral deceit works very well as a pollination strategy effecting outcrossing in the Orchidaceae and helps to explain the great diversity of orchid blooms and their success as the largest plant family.

References

Bates, R. (1979) "*Leporella fimbriata* and its ant pollinators" *J. Nat. Orch. Soc. S. Aust.* 3: 9-10.

Bates, R. (1985) "Extra floral nectaries, pseudo-nectaries and vestigial nectar-spurs in *Dipodium punctatum* R. Br. *J. Nat. Orch. Soc. S. Aust.*

Beardsell, D.V. & Bernhardt, P. (1982) "Pollination biology of Australian terrestrial orchids" in E.G. Williams et al *"Pollination '82"* (Melb. Uni.).

Coleman, E. (1929) "Pollination of an Australian Orchid. *Cryptostylis leptochila* F. Muell" *J. Botany* 67: 97-9.

Jones, D.L. (1981) "The pollination of selected Australian orchids" *Proc. Orch. Sym. 13th Intl. Bot. Congr.* 40-43.

Jones, D.L. & Gray, B. (1974) "The pollination of *Calochilus holtzei F. Muell" Amer. Orch. Soc. Bull.* 43: 604-6.

Peakall, R. (1985) "Observations on the Pollination of *Leporella fimbriata*" Orchadian 8(2): 44.

Pijl, L. van der & Dodson, C. (1966) "Orchid flowers their pollination & evolution" (Miami Uni.)

Stoutamire, W.P. (1975) "Pseudocopulation in Australian terrestrial orchids" Amer. Orch. Soc. Bull. 44: 226-233.

Stoutamire, W.P. (1983) "Wasp pollinated species of Caladenia in South-western Australia" *Aust. J. Bot.* 31: 383-94.

Vogel, St. (1978) "Evolutionary shifts from reward to deception in pollen flowers" in "The Poll. of Flowers by Insects" ed. A.J. Richards (Linnean Soc.: London).

38 Portmarnock St
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4 June 1985

Consolidated Index: The Council would like to inform our readers that work is proceeding on this index and expect it to be with the printer in the next few weeks. We apologise for the long delay; it has proven to be an expensive and time consuming task undertaken with very limited means.

Colour Fund Contributions: The Council would like to thank the contributors to the Colour Fund and remind readers that these contributions are of material assistance in providing the colour reproductions.

IMPORTANT NOTICE

Due to the ever increasing costs related to the production of the Orchadian and the storage of back issues and membership details it has been decided by ANOS Council to take over the Management of the Membership lists etc.

Please address **ALL** enquiries to A.N.O.S. at the following address:

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AUSTRALASIAN NATIVE ORCHID SOCIETY

Statement of Receipts and Payments for year ended 30 June, 1985

Receipts	1984/85 $	1983/84 $
Membership Subscriptions	4,500.82	11,371.64
Bank Interest	261.87	238.41
Sale of Badges	15.50	50.00
Sale of Orchadian — Back Issues	596.37	1,058.95
Sale of Hybrid Check Lists	19.00	101.80
Advertisements in Orchadian	421.50	565.50
Miscellaneous	97.21	14.42
Sale of Medals	313.00	338.00
Sale of Index	40.00	455.00
Subscriptions 1985-1986 in Advance	1,458.98	-
Donations to Colour Fund	587.25	-
Donations	23.00	-
Publications	49.00	-
21st Workshop	1,618.26	-
Colour Trust Fund	-	1,077.88
	10,001.76	15,271.60
	4,468.26	677.71
Cash at Bank 1/7/84	14,468.02	15,949.31

Note: *The $11,371.64 quoted on 1983/84 under Member Subscriptions included an amount of $3,876.00 paid by members in advance for 1984/85 Membership.*

Payments	1984/85 $	1983/84 $
Orchadian Printing, Postage, etc.	8,281.92	8,189.95
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Secretarial Advance	100.00	-
Miscellaneous Expenses		
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Registration of Publication	30.00	70.00
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	13,816.94	11,483.05
Cash at Bank 30/6/85	651.08	4,466.26
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In addition to the above, the Society has an Interest Bearing Term Deposit with Westpac Banking Corporation of $1,500.00 and Passbook Saving Account with St. George Building Society held in trust for Colour Trust Fund of $1,427.15.

E. HUSTED Hon. Treasurer.

AUDITOR'S REPORT

In my opinion the above Statement of Receipts and Payments for the year ended 30th June, 1985 is properly drawn up and is in accordance with the books of account of the Society, and gives a true and fair view of the cash position at 30th June, 1985.

G.J. ANGEL, J.P., A.A.S.A., C.P.A. Honorary Auditor.

Sydney, 15th July, 1985.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the R.H.S. from lists in the
Orchid Review — May — August 1985)

NAME	PARENTAGE	REGISTERED BY
DENDROBIUM		
Duffy	*striolatum* x *pugioniforme*	W. Skillicorn
Ida Mary	*beckleri* x tenuissimum	W. Skillicorn
Joy Wray	*kingianum* x Kingrose	S.G. Wray
Pink Ballerina	*agrostophyllum* x *bigibbum*	W.T. Upton
Tawhai	Kingrose x Bardo Rose	S.G. Wray
Aussie Aurora	Peter x Star of Gold	P. Spence Orchs.
Aussie Ecru	*ruppianum* x Eureka	P. Spence Orchs.
Limestone	*mortii* x *cucumerinum*	W. Skillicorn
Memoria Lloyd Bradford	*canaliculatum* x *speciosum*	P. Spence Orchs.
Penana Angel	Merritt Island x *canaliculatum*	Ooi Leng Sun Orchs.
Robyn Kaylene	Ella Victoria Leaney x *gracilicaule*	R. Haylock (J. Elmy)
Valda	discolor x *carronii*	K. & V. Hatcher

Corrigenda p.93 line 17 should read — Golden Cascades.

Who's Who

A Directory to the Australasian Native Orchid Society —Its Officers and Group Contacts

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- **Sydney group** — Tel: 635 8769 (Neil Finch). Meets 8 p.m. 3rd Friday each month at Lady Game Community Centre, Moore Avenue and Bradfield Road, West Lindfield.
- **Warringah Group**— Tel: (02) 99 2468. Meets 8 p.m. 2nd Thursday each month at Thomas Vickers Memorial Hall, Cnr. Pitt and Grainger Roads, North Curl.
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- **Central Coast Group** — Tel: (043) 88 1785. Meets 8 p.m. 2nd Wednesday each month at Baptist Church Hall, York & Frederick Streets, East Gosford.
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- **Far North Coast Group** — Tel: (066) 24 1023. Meets 1st Thursday each month at Ballina High School, Burnett Street, Ballina.

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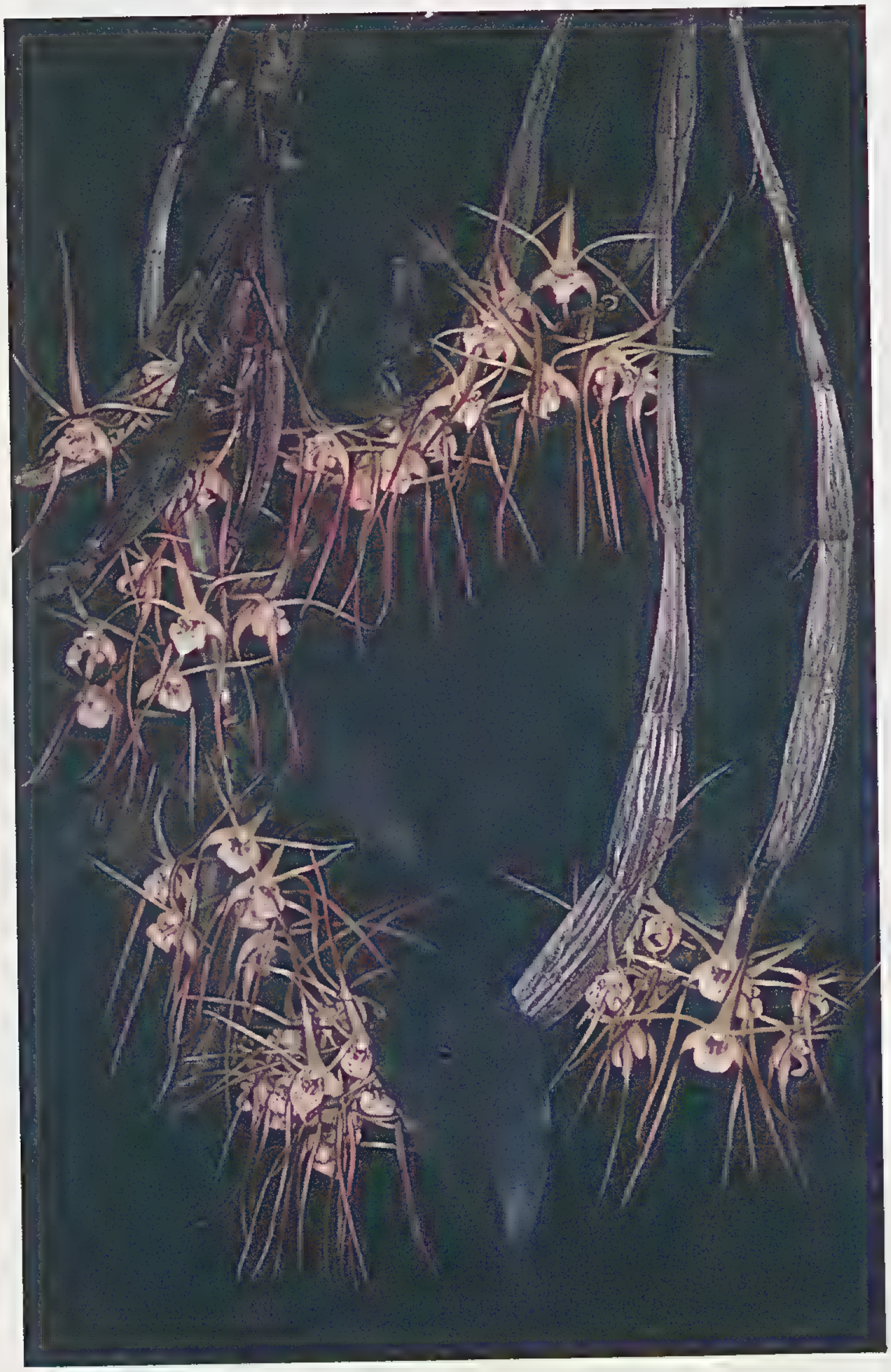

CHAMPION EPIPHYTE SPECIES OF WARRINGAH GROUP'S SPRING SHOW — MONA VALE, 1985.

Dendrobium tetragonum. Owner — Sid Batchelor.

Photography — Garry Wells

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Corrigenda — E.G. Gordon obituary dates should read 8/2/1984 to 31/8/1985.

EDITORIAL

With the passing of the year we reflect with sadness on the loss of some of our oldest members leaving an unfillable gap in our ranks.

However so burdened, we face the New Year with renewed hopes and ambitions which in the orchid world means luxuriant growth and even better flowering from our plants.

A.N.O.S. Council hopes to have solved our recent problems with the distribution of The Orchadian by taking over this function itself. The New Year is omened well by the formation of two new groups, both in Queensland. Welcome to A.N.O.S. and, editorially speaking, we look forward to hearing from any aspiring authors among those groups. There is certain to be a great deal of "know-how" that would be avidly perused by our readers. In mentioning this, it brings to mind the wealth of interesting and informative articles appearing in the various group journals over the course of the year. This is not surprising given the expertise and dedication so often characteristic of A.N.O.S. members; what is surprising, however, is how few of these authors deem their efforts worthy of a wider audience by offering them for consideration in this journal. Perhaps some New Year's resolutions could be founded on overcoming this diffidence.

Best Wishes for the New Year.

Looking forward to hearing from you.

M. Spence
M. Penberthy

NATIONAL HERBARIUM OF VICTORIA 3 MAR 198

Colourful *Thelymitra* Hybrids

by R. Bates

Few orchid genera can match the glorious colour of *Thelymitra*, the sun-orchids. Most of the forty species are Australian but some occur in New Zealand and one extends as far as the Philippines. There is a predominance of blue flowered species, a rare colour in the orchid world, but there are also pinks, yellows, white, purple, green, brown, spotted or striped flowers with a kaleidoscope of colours.

Flowers of this genus are pollinated chiefly by small fast flying native bees. The bright colour and perfume of sun-orchids seem to advertise the presence of food but provide none. *Thelymitra* are probably floral mimics, with the yellow column appendages representing pseudo-stamens with false pollen. Visiting bees, lured by bright colours and perfume, investigate the false-stamens in search of pollen, inadvertently collecting the real orchid pollinia on their hairy undersides. The bee pollen vectors are relatively non specific; the author has observed a single bee visiting three species of *Thelymitra* in just a few minutes. Pollination strategies therefore do not present any strong barrier to cross pollination, nor do there appear to be any internal barriers to hybridisation. Flowers of *Thelymitra nuda,* for example, set viable seed when crossed with such diverse species as *T. antennifera, T. rubra, T. crinita* and even *Calochilus robertsonii*!

Orchids throughout the world are known for their wealth of natural hybrids. Van der Pijl and Dodson (1966) suggest that this is due to the transference of orchid pollen as pollinia (masses of pollen) which results in the production of a large number of seeds. Consequently the likelihood of producing fertile seed is greatly increased. Lack of an endosperm may be a further reason allowing the germination of orchid hybrids, as in some plants the endosperm has been found to prevent the growth of hybrid embryos (Lenz & Wimber 1959).

Thelymitra hybrids are in fact quite numerous and can be expected anywhere that two sun orchid species flower together!

How can they be recognised?

1. They normally occur in disturbed areas i.e where new habitats are provided which favour hybrids at the expense of species. Hybrids such as *T.* x *macmillanii* for example may all but replace its parent species in some areas of continuously disturbed grassland.
2. The actual number of hybrid plants in any area is generally low (except in the case of vegetatively reproducing plants such as *T.* x *macmillanii*). Plants are often scattered as single individuals amid large numbers of the putative parents.
3. The plants are normally intermediate between the parents in most respects although there are important exceptions i.e. the crossing of a yellow flowered species and a blue does not produce a green flowered hybrid. Sometimes a particular feature of one of the parents becomes exaggerated in the hybrid i.e. size of column appendages.
4. Unusual colour combinations such as the red with gold edging of *T.* x *macmillanii* or the stripes and spots of *T. merranae* are indicative of a hybrid. Quite bizarre combinations such as yellow with blue spots may occur (e.g. *T. villosa* x *T. nuda*).
5. Variability in the flowers is a common indicator of hybrids especially when backcrossing occurs.
6. Infertility of pollen or lack of seed set is common in many hybrids but of little value in the recognition of *Thelymitra* hybrids which are often self-pollinated and produce large amounts of seed.
7. Hybrid vigour — quote often the hybrid sun orchids are sturdy plants with larger, brighter coloured flowers than the parents.

To sum up: If you find a single clump of unusually coloured sun-orchids in a disturbed invironment near large populations of two or more species and the flowers are intermediate in some respects between two of the species you can be fairly sure you have a hybrid. The more diverse the two suspected parents are in colour and morphology, the easier it is to recognise the hybrid and vice versa.

There is a significant factor which helps to keep the number of *Thelymitra* hybrids at a "respectable" level. **A large proportion of sun-orchids are self pollinated,** quite often pollination occurring in the bud. This does not however preclude the transfer of pollinia from a self-pollinated species to a strongly outcrossing one. In fact most crosses are between a self-pollinated and an outcrossing species with the latter as pod parent. When two outcrossing species do occur in the same area they tend to flower at different times and to be very different in colour and column shape. *T. nuda* and *T. antennifera* for example are often sympatric but *T. antennifera* tends to flower earlier; its yellow flowers contrast with the blue of *T. nuda.* The brown antenna-like clumn appendages of *T. antennifera* are quite different to the white hair tufts of *T. nuda* and could be expected to attract different bees.

Clements (1982) lists four named Thelymitra hybrids. These are *T.* x *chasmogama, T.* x *cyanea, T.* x *irregularis* and *T.* x *juncifolia.*

The first of these *T.* x *chasmogama* was named by R. Rogers in 1927 from plants collected at Golden Grove in South Australia. It was suggested by Nash (1972) and endorsed by Bates (1981) and Clements (1982) that the parent species of *T.* x *chasmogama* were the pink flowered *T. luteocilium* and the blue *T. nuda.* Most *T.* x *chasmogama* are a slaty pink in colour, similar to *T. luteocilium* but larger and not self pollinated as in that species. *T.* x *chasmogama* is widespread in South Australia and in Victoria but reports of its occurrence in Tasmania and New South Wales probably refer to hybrids of similar morphology but different parentage e.g. *T. nuda* x *T. rubra* or *T. pauciflora* x *T. rubra. T.* x *chasmogama* does well in cultivation, multiplying and flowering freely.

T. x *cyanea* was named by Lindley from Tasmanian material (originally as *Macdonaldia cyanea*). Clements records it from Tasmania, Victoria and New South Wales. It has long been considered a hybrid between *T. venosa* and *T. pauciflora.* I do not know of its occurrence in cultivation.

T. x *irregularis* was first treated as a hybrid by Jones (1974). He gave the putative parents as *T. ixioides* and *T. rubra* but Clements (1982) gives *T. carnea* x *T. ixioides.* Certainly most plants identified as *T.* x *irregularis* have been *T. ixioides* x *T. rubra.* The original *T.* x *irregularis* was collected at Wonthaggi in Victoria in November 1934 by E. Homann. Perhaps only he would know if they were growing with *T. carnea* or *T. rubra*! Plants matching very well with the original *T.* x *irregularis* have been collected from Victoria, Tasmania, New South Wales and South Australia. *T.* x *irregularis* flowers and multiplies freely in cultivation. Fig. 1 (Centre pages) by Jeff Jeanes of Melbourne shows what a beautiful plant it is.

Clements (1982) gave the name *T.* x *juncifolia* Lindley for plants which were hybrids between *T. ixioides* and *T. pauciflora* (Fig. 5) but he (pers. comm. 1984) noted that this was incorrect. *T.* x *truncata* named by Rogers in 1917 from plants collected near Myponga in South Australia was almost certainly a cross between *T. ixioides* and *T. pauciflora.* There has been much discussion on this rather common hybrid (see McAlpine 1978, Bates 1977 and Markwick 1985) and it has suffered much at the hands of the taxonomist (the present author not excepted). It ranges from a spindly self-pollinated plant with dull blue flowers having few spots in South Australia, to a large showy plant with lilac flowers heavily spotted blue in New South Wales. This is no doubt due to the change in stature exhibited by the *T. ixioides* parents over this range.

Another *Thelymitra* which is almost certainly a hybrid is *T.* x *macmillanii* first described from plants collected east of Melbourne and named by Mueller (1865). There can be little doubt that *T. antennifera* is one parent but as to the other species involved this could be *T. luteocilium* (as suggested by Nash 1972 and by the present author 1981, 1984), *T. rubra, T. carnea* or even *T. nuda.* Certainly the Western Australian plants identified as *T.* x *macmillanii* appear to be crosses between *T. antennifera* and *T. nuda.* In South Australia most plants accepted as *T.* x *macmillanii* are *T. antennifera* x *T. luteocilium.* Flowers are large, freely expanding and usually a brilliant crimson often edged with gold (see Fig. 2). In cultivation plants increase freely but do not flower well perhaps as a result of low light intensity as the hybrid prefers very open sites in nature.

Another Australian sun orchid, *T. merranae* Nicholls is also considered to be of hybrid origin. McAlpine (1978) suggests *T.* x *truncata* and *T. ixioides* as putative parents. Certainly plants seen by the present author in New South Wales in 1984 were of this origin.

A New Zealand species, *T. dentata,* has been suggested as a possible hybrid between *T. pauciflora* and *T. pulchella* (pers. comm. K. Luff 1985).

The recombination of colours in hybrid *Thelymitra* would make a fascinating study. For example what does happen when a yellow flowered species is crossed with a blue? As already mentioned previously it seems likely that the result is closest to orange-red (Brown 1984). The author noted that plants which appeared to be hybrids between the yellow *T. flexuosa* and the blue *T. pauciflora* in Western Australia had pink flowers and were very similar to *T. carnea.* It is likely that all the records of *T. carnea* in Western Australia and probably most of the South Australian plants are actually *T. flexuosa* hybrids! Photo 3 by Andrew Brown of crosses between the blue flowered *T. nuda* and the yellow and brown *T. villosa* show some startlingly beautiful colour combinations. It would be fascinating to conjecture as to the colours of a hybrid between the iridescent purple, red and gold streaked *T. variegata* of Western Australia and the blue striped *T. venosa* of Eastern Australia.

Over twenty different un-named *Thelymitra* hybrids have now been recorded. Many of these have been between the similar blue flowered species and are difficult to recognise as hybrids, but all suspected crosses are given in the list below.

Putative Un-named Thelymitra Hybrids.

T. .antennifera x *T. nuda* (see Brown 1984, Heberle 1984) from Western Australia and South Australia.

T. antennifera x *T. rubra* (see Bates 1981) from South Australia and Victoria. (See Fig. 4)

T. antennifera x *T. spiralis* from Western Australia (Heberle pers. comm. 1984, Brown 1982).

Colourful Thelymitra Hybrids

T. aristata x *T. nuda* (Bates 1976) from Alligator Gorge, South Australia.

T. campanulata x *T. spiralis* (See Fig. 6 by A. Brown) from near Northampton, Western Australia.

T. canaliculata x *T. nuda* (Nash 1972, Bates 1981) from South Australia's mallee areas.

T. cornicina x *T. crinita* (Brown 1982) from Western Australia.

T. flexuosa x *T. pauciflora* (Brown 1984) from Western Australia, South Australia.

T. holmesii x *T. ixioides* (Bates 1981) from South Australia.

T. ixioides x *T. mucida* (Bates 1980) from South Australia.

T. ixioides x *T. nuda* (Nash 1972, Markwick 1985) from Victoria and South Australia.

T. ixioides x *T. rubra* from Victoria and South Australia = *?T. x Irregularis.*

T. matthewsii x *T. rubra* from the Grampians (Bell pers. comm. 1982).

T. mucida x *T. nuda* (Bates 1982) from Williamstown, South Australia.

T. nuda x *T. pauciflora* (Markwick 1979) from South Australia, Victoria and New South Wales. Often reported but difficult to be sure of.

T. nuda x *T. rubra* from Victoria and South Australia (Garnham pers. comm. 1983).

T. nuda x *T. villosa* from near Northampton, Western Australia (see Fig. 3 by A. Brown).

T. pauciflora x *T. holmesii* from Mylor, South Australia (Bates 1984).

T. pauciflora x *T. rubra* from Victoria (Garnham pers. comm. 1982).

T. pauciflora x *T. venosa* from Tasmania = *?T. x cyanea.*

T. x *truncata* x *T. ixioides* Barrington Tops etc. New South Wales. McAlpine (1978) equates this with *T. merranae.*

References

Bates, R. (1976) 'Mount Remarkable National Park" *Orchadian* 5:78 and also letter in *Orchadian* 6:20 (1978).

Bates, R. Various articles in *Journal Native Orchid Soc. S. Aust.* April 1980; Aug., Sept, Oct, Nov, 1981; Dec 1982; June 1984.

Bates, R. (1985) "Thelymitra Pollination" *Bull. Aust. Nat. Orch. Soc. (Victoria)* 17(8):8-9.

Brown, A. (1984) "Some Thoughts on *Thelymitra macmillanii* & *T. carnea* in Western Australia" *J. Nat. Orch. Soc. S. Aust.* 8:84-85 and various articles in *Bull. West. Aust. Nat. Orch. Study & Cons. Grp.*

Cady, L. & Rotherham, E.R. (1970) "Australian Native Orchids in Colour".

Clements, M.A. (1982) "Preliminary Checklist of of Australian Orchidaceae" (Nat. Bot. Gdns.: Canberra)

Heberle, R. (1984) "*Thelymitra macmillanii* in Western Australia" *J. Nat. Orch. Soc. S. Aust.* 8:74-75.

Lenz & Wimber (1959) "Hybridization & Inheritance in Orchids" in Withner, C.L. (Ed.) *"The Orchids, a Scientific Survey".*

Markwick, R. Various articles in *Journal Native Orchid Soc. S. Aust.* Aug. 1979; July 1984; March, April, May 1985.

McAlpine, D.K. (1978) "On the Status of *Thelymitra truncata* Rogers" *Orchadian* 5:324.

Nash, R.C. (1972) 'The South Australian Sun Orchids' *Aust. Plants* 6:319-327.

van der Pijl, L. & Dodson, C.H. (1966) "Orchid Flowers: their Pollination and Evolution".

38 Portmarnock St.
Fairview Park
S. Aust. 5126.

27 May, 1985
Rec. 4 June, 1985

A New Species of *Pterostylis* from Northern New South Wales

by D.L. Jones

Summary

Pterostylis abrupta **is described as a new species from the mountains and tablelands of northern NSW.**

Introduction

Studies into orchids allied to *Pterostylis decurva* R. Rogers in eastern Australia have revealed a taxon which is here described as new. This orchid has been suspected for many years of being distinct but it is only recently that critical comparisons with *P. decurva* have been undertaken.

Pterostylis abrupta **D. Jones species nova affinis** ***P. decurvae*** **R. Rogers sed floribus maioribus rubro-suffusis, labello longiore (14-17mm) et sinu prominenti protrudenti abrupte.**

Typus: Barrington Tops, northern NSW, 20 Jan 1985, D.L. Jones 1798, L. Barton and T.D. Jones (holotypus NSW; isotypus BRI, MEL).

Description

Plant very slender, 20-40cm tall. Radical leaves absent during anthesis, appearing as a rosette on non-flowering plants. Rosette of 2-3 leaves; lamina 15-25mm x 10-15mm, ovate to elliptical, mid-green, margins finely crenulate; petioles 8-10mm long. Stem-bracts 4-6, up to 4cm long, linear-lanceolate, well developed, spreading obliquely, with long acuminate tips. Flower solitary, variable in size, dark green and white with deep reddish suffusions particularly on distal parts of the galea. Galea 28-40mm long (measured in a straight line from the base of the flower to the petal tips), erect at the base then curving forward through a semi-circle. Dorsal sepal gibbous near base, ending in a filiform point 12-18mm long. Lateral sepals 40-50mm long, conjoined for one-third of their length to form an erect lower lip which is notched at the centre of upper margins, the latter internally revolute, forming an abrupt, prominently protruding, minutely scabrid sinus, suddenly contracting into filiform points which rise 35-40mm and extend above the galea. Petals 28-35mm x 6-8mm, falcate-lanceolate, reddish-brown, dilated in distal part, apex acuminate. Labellum 14-17mm x 3mm, linear-oblong, on an irritable claw, upright for half its length then curving forwards gently, reddish brown, with a longitudinal ridge running along the centre and expanding at the tip; apex obtuse, the point just protruding through the galea; appendage 2.5-3mm long, curved, trifid, penicillate. Column 13-14mm long, the distal part of the wings produced into a linear tooth 1mm long, the lower lobes linear-falcate, obtuse, sparsely hairy on the inner margins. Stigma central, elliptical, 2-3mm long. Anther about 2mm long, with a very short rostrum. Pollinia four, linear-clavate, about 1.6mm long.

Collections Examined: Barrington Tops, Jan 1926, C. Barrett (NSW); Barrington Tops, March 1925, Prof. Harrison (NSW); Barrington Tops, 5000′, Jan 1928, H.M.R. Rupp (NSW); Ebor Falls, New England, Jan 1941, Consett Davis (NSW); Barrington Tops, A.W. Dockrill and W.W. Abell, 27 Dec 1947 (BRI); Barrington Tops, Schmidt, 10 Jan 1950 (NSW); Barrington Tops, A.W. Dockrill, 3 March 1953 (NSW, BRI); Point Lookout, Ebor, L.W. Archer and J.W. Green, 6 April 1958 (NSW); near Carey's Peak, Barrington Tops, N. Jupp, J. Moore & S. Clemesha, 27 Feb 1964 (BRI).

Distribution: Northern Tablelands of NSW, particularly the Barrington Tops but also higher parts of the New England Tableland.

Habitat: Beside streams, in moist forest and in open grassland above 1500m altitude.

Flowering Period: December-March.

Affinities: *Pterostylis abrupta* is closely related to *P. decurva* but is much more robust than that species with larger flowers, the petals of which are suffused with deep red, a longer labellum and column and a prominently protruding sinus. The rosettes of the two species are quite distinct, those of *P. decurva* having entire leaves while those of *P. abrupta* are minutely crenulate. *P. abrupta* has superficial affinities with *P. aestiva* D. Jones but this species has bluish-green flowers and a longer labellum which narrows in the distal half. *P. russellii* P. Hunt from south-eastern Queensland has smaller flowers than *P. abrupta* and lacks the reddish tints of that species.

Etymology: The specific epithet refers to the prominent sinus which juts out abruptly below the galea.

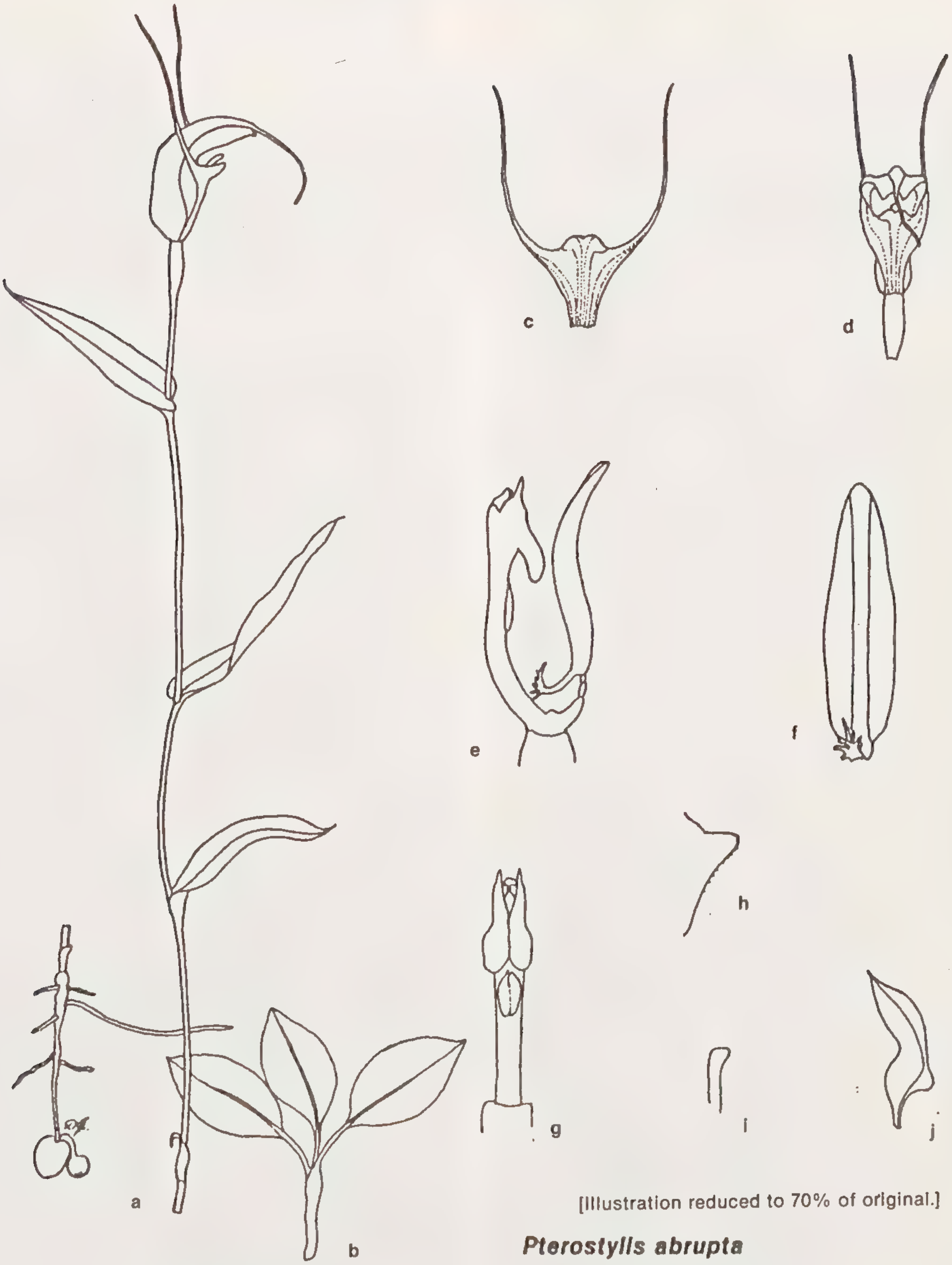
Acknowledgements

I thank Mark Clements for stimulating discussions on this genus and Joe Betts for assisting with the Latin diagnosis.

Footnote:

P. abrupta is the species from the New England district which has long been (incorrectly) called *P. decurva*.

Pterostylis abrupta



[Illustration reduced to 70% of original.]

Pterostylis abrupta

a) flowering plant x 1
b) rosette x 1
c) conjoined lateral sepals x 1
d) flower from front x 1
e) column and labellum from side x 5

f) labellum from above x 4
g) column from front x 3
h) sinus x 2
i) pollinium x 10
j) petal x 1

P.O. Box 261
Palm Beach
Qld. 4221.

DECEMBER 31st, 1985

Notes on the Cultivation of Cool-Growing Sarcanthinae Species

by M. Harrison

In cultivation, the temperate Australian Sarcanthinae species can be broken into two broad groups. The lithophytes, *Sarcochlius ceciliae, S. fitzgeraldii* and *S. hartmannii,* form a small, natural group with quite similar cultural requirements. These orchids generally do well in cultivation and it is not unusual to see large specimen plants which have been obviously nurtured and grown-on for many years. On the other hand, the true epiphytes are a large and diverse group with differing environmental requirements. Some are relatively easy to grow whilst others are virtually impossible to keep alive for any reasonable length of time.

S. ceciliae, S. fitzgeraldii and *S. hartmannii* are commonly and, I think, most successfully grown in terracotta pots, in a gravel/bark mix, consisting of about 60% bark (fir, pine or casuarina) and 40% gravel. The addition of a small amount of cymbidium compost as an organic component to add "body" to the mix is also recommended by some growers, and this may be particularly applicable in the case of *S. hartmannii.* There are many variations one can make to the mix composition. Some growers add charcoal, perlite, scoria, polystyrene, etc. in varying amounts and combinations. As long as the mix drains freely and contains no toxic material, it should be suitable. It should have some moisture holding capacity and should also have a structure which allows for good air movement through the mix.

In the bush, these species usually grow in situations where their roots are partially or completely buried under layers of humus on rock ledges or trapped in crevices. Ferns and mosses are often present and the orchid roots penetrate into this rich layer to seek nutrients, water and protection from extremes of weather. Accordingly, these species are heavier feeders than the epiphytic types and should be fed regularly, particularly during their peak growing times, spring and autumn. *S. hartmannii* in particular, can almost be grown in an open soil mix, and where conditions are ideal will develop thick, succulent white roots nearly as thick as own's little finger. I have grown a plant of *S. hartmannii* in a potful of pure leaf mulch from the bush and it did very well for some years until the mulch broke down and I had to repot.

A technique I have used over recent years with these lithophytes, is to top dress the pot with natural leaf mulch from the bush. This mulch I break up a little by simply crushing it in my hand, and then I sprinkle it on the medium surface to form a layer no more than 5mm thick, extending from the base of the plant out to the rim of the pot. Anything more than 5mm could result in a reduction of air circulation through the pot, as well as clogging of the medium. This is especially useful where the medium used is course and open or where the major component is gravel or blue metal. As it breaks down further, the leaf mulch is washed down into the mix, a little each time the plant is watered. This provides supplementary feeding and also some protection for the newly emerging roots. I have noticed that these new roots like to grow into and through the leaf mulch.

Light levels required for these species are somewhat more than most of the epiphytic species but adequate shading must be provided, especially during summer. The rule for these orchids is to grow them in the shade and flower them in the sun. What this means in practice is to keep them quite shaded following flowering through the summer and autumn, and then to increase light levels from late autumn until flowering again. *S. ceciliae* is the most light tolerant of the three and *S. fitzgeraldii* the least light tolerant.

Watering must be carefully monitored, as an excess over too long a period will cause rotting or die-back. I feel it is better to keep plants on the dry side during hot weather to avoid the problem of "steaming" or "broiling" which sometimes occurs on very hot days, especially if air circulation is not so good. In summer, I water only in the evening, after the sun has gone off the orchid house, so that plants will stay damp overnight but will have dried off by next morning. Do not try to keep the compost wet during summer; aim instead to keep the entire plant cool and in a well ventillated position. You will, of course, need to water regularly during summer to keep the compost from becoming totally dry, but too many growers overdo this.

Once the weather cools a little, usually by late February, then water and feed heavily. Drainage through the pot must be good;

remember, these orchids grow naturally on rock ledges and cliff faces where excess water cannot accumulate. From this time through until the beginning of winter these plants will make their most sustained growth. The root tips will be completely extended and the leaves will shoot up.

With pot culture there is always a danger that the compost at the centre of the pot will remain too wet, impeding root growth and causing premature breakdown of the medium. This is a particular problem with the larger containers used for specimen plants. Most growers make a habit of crocking the bottom ⅓ of their pots, usually with broken chunks of terracotta or large river pebbles. One very effective way of overcoming this problem, especially with large containers, is to place an empty, unturned pot in the bottom of the main pot and to bill the potting medium around this second pot. This results in a large open air space in the centre of the pot, allowing excellent drainage and improved air circulation. A terracotta slot-pot is well suited to this purpose.

Once the cold weather is really upon us ease up on the watering but do not come to an abrupt halt. These orchids can remain on the damp side during winter; they certainly do so in the bush. Take care when watering to ensure they are not kept wet and maintain good air circulation. They will continue to grow at a reduced rate during winter so continue feeding from time to time and, as previously mentioned, increase light levels. Protect from frost in winter, for this is a killer. Simple cold will not bother them and plants in my collection have been down to -2°C without any ill effects under fibreglass protection. As winter comes to an end and flowering becomes imminent, increase watering to keep up with increasing temperatures. If you are grooming your plants for the showbench try to keep buds dry and air circulation good, as buds will spot readily. After flowering, as the weather warms up, keep plants cool and shaded and beware of overwatering if the heat comes early. If we are blessed with a cool, damp spring, then these orchids will respond by making good root and leaf growth during this period and will continue to do so until the hot weather arrives and slows them down.

The epiphytic species form a much larger and less homogenous group, consisting of the remainder of the *Sarcochilus, Papillilabium, Schistotylus, Rhinerrhiza, Plectorrhiza genera*, as well as many of the diminutive tropical genera. These cannot really be grown successfully in pots. They perform much better under slab culture and, as their root systems are much more exposed, consequently require more exacting atmospheric conditions.

The majority of these species usually grow near water, often overhanging creeks or semi-permanent water courses. This indicates cool conditions with rising humidity and this is, I believe, the single most important factor in the successful cultivation of these types of orchids. Where plants are seen away from water, they are generally situated in the path of a rising stream of cool, humid air, often on a hillside above a river or creek. Where this is not the case, then their moisture/humidity requirements are being satisfied from another source — regular clouds and mists. *S. falcatus* is a good example of an orchid which extensively colonises ridge tops which are periodically bathed in cloud. The epiphytic moss which invariably festoons the trees and shrubs growing in such situations attests to this fact.

Of course, there are considerable differences in the requirements of the orchids in this group, with species such as *S. olivaceus* and *S. falcatus* preferring damper conditions — their roots are often buried within a thick layer of mosses and ferns — and *S. australis, S. hillii* and *S. dilatatus* apparently resentful of excess moisture, and usually seen with their root surfaces completely exposed, running along bare branches and twigs. There are also a few which seem cosmopolitan in their demands and may be encountered in damp, deeply shaded situations, as well as in much drier, relatively open conditions. *Pteroceras spathulatus* and *Plectorrhiza tridentata* are such orchids, as is *Rhinerrhiza divitiflora.* Stunted plants of *S. falcatus* are also sometimes seen in very exposed positions but they are very much the exception to the rule. Each species has its own niche within the available environment, and while these may overlap at times, there are conditions which suit it ideally.

There are quite a few hosts which are commonly used in cultivation — the original or natural host, cork, ironbark totems, hardwood, treefern. Each of these have merit and can be used with success as long as the grower treats the orchid/host combination in a suitable manner. Cork and hardwood hold little moisture and plants on these hosts must have ample water. I use these for the drier growing species, *S. australis, S. dilatatus* and *S. hillii,* to ensure fast and complete drying. However, they are suitable for any of the species as long as water requirements are observed. The use of epiphytic moss with cork and hardwood is recommended for the damper growing species.

Continued page 128

Thelymitra Hybrids
R. Bates

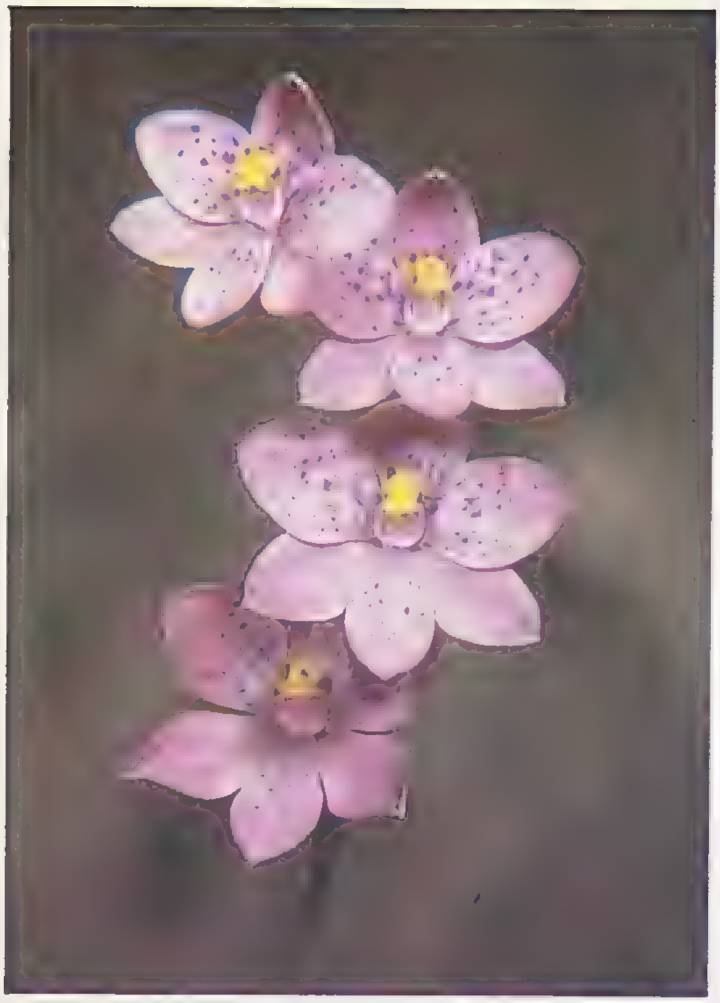


Fig 1. *Thelymitra x irregularis*. Probable parents, *T. ixioides* and *T. rubra*.
Photographed by J. Jeanes in Victoria.

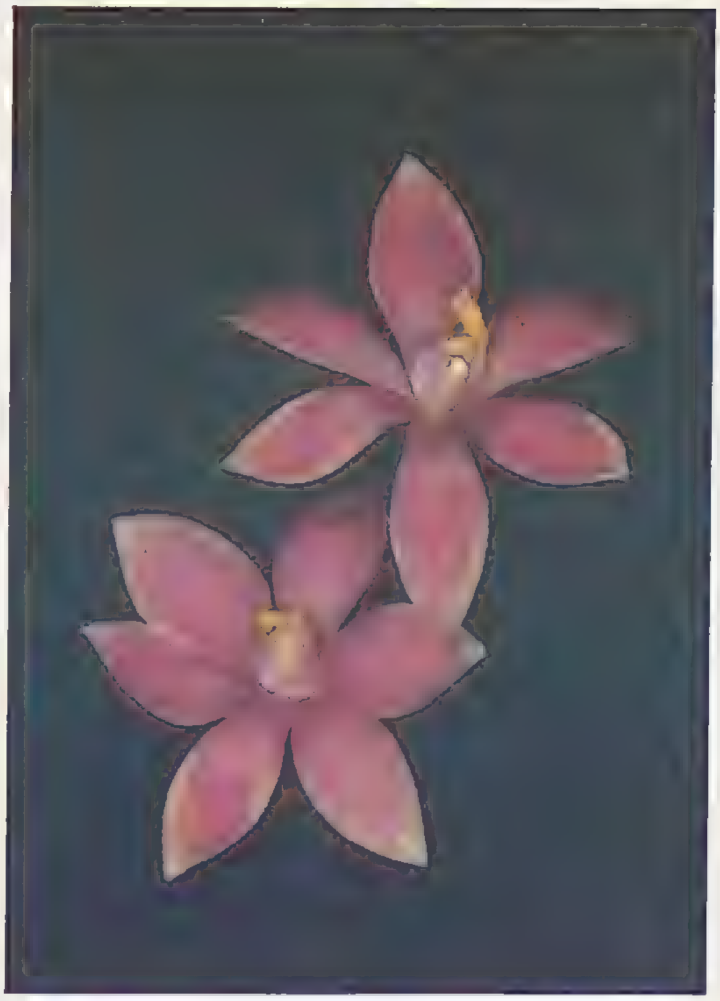


Fig 2. *Thelymitra x macmillanii* Probable parents, *T. antennifera* and *T. luteocilium*.
Photographed by R. Bates in South Australia.

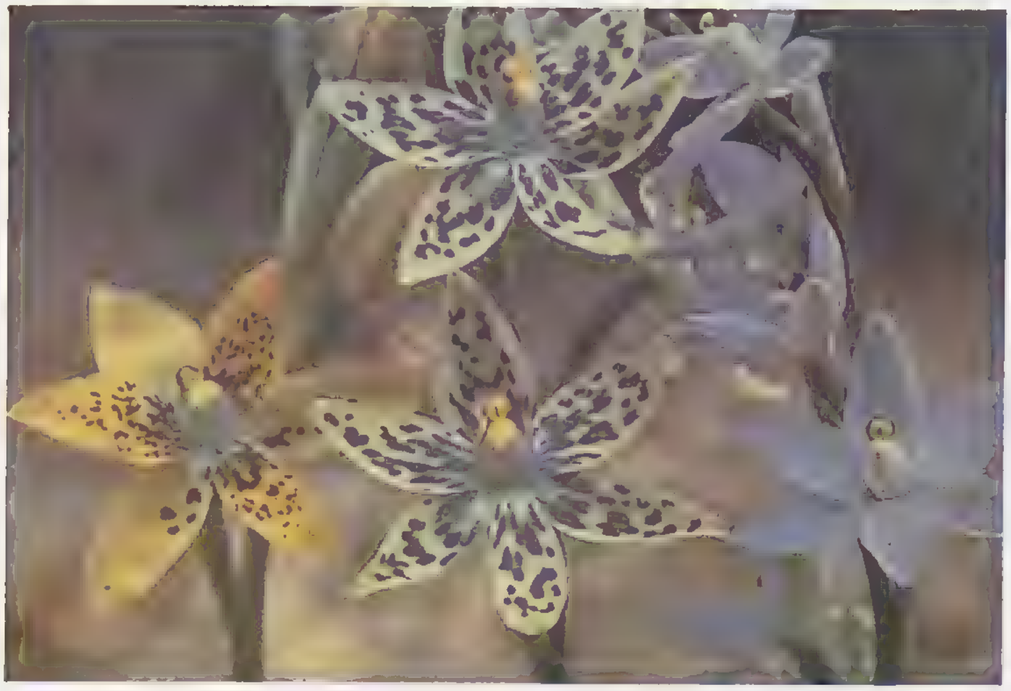


Fig 3. *Thelymitra villosa* x *T. nuda* with backcross and *T. villosa*.
Photographed by A. Brown in Western Australia.

Thelymitra Hybrids

R. Bates

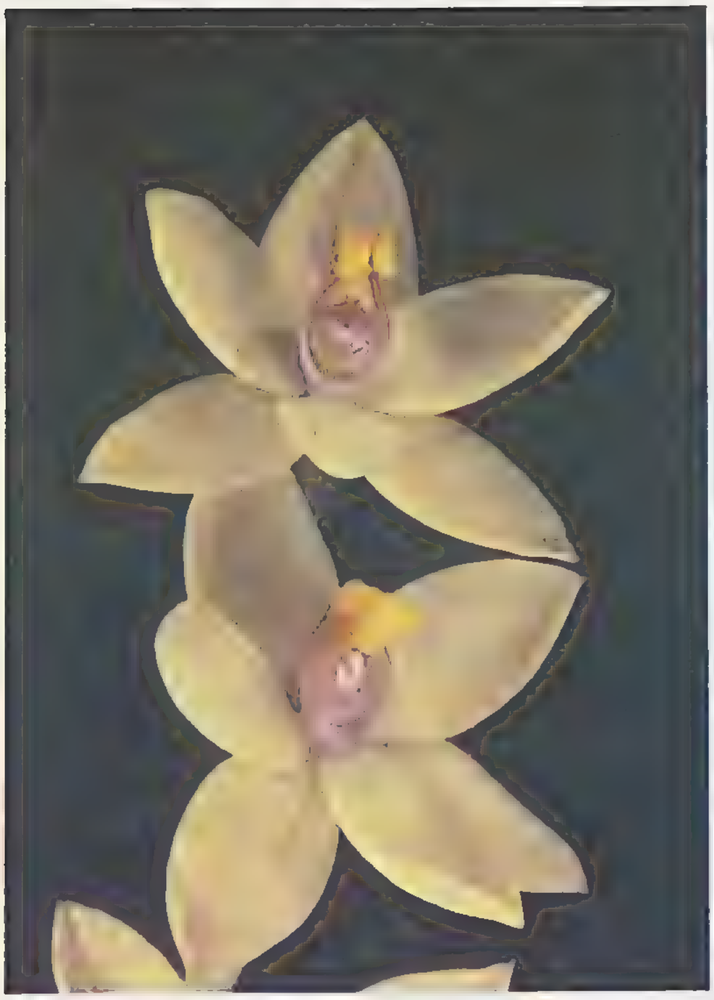


Fig 4. *Thelymitra antennifera* x *T. rubra* from South Australia. Unusual yellow form of a normally pink hybrid.

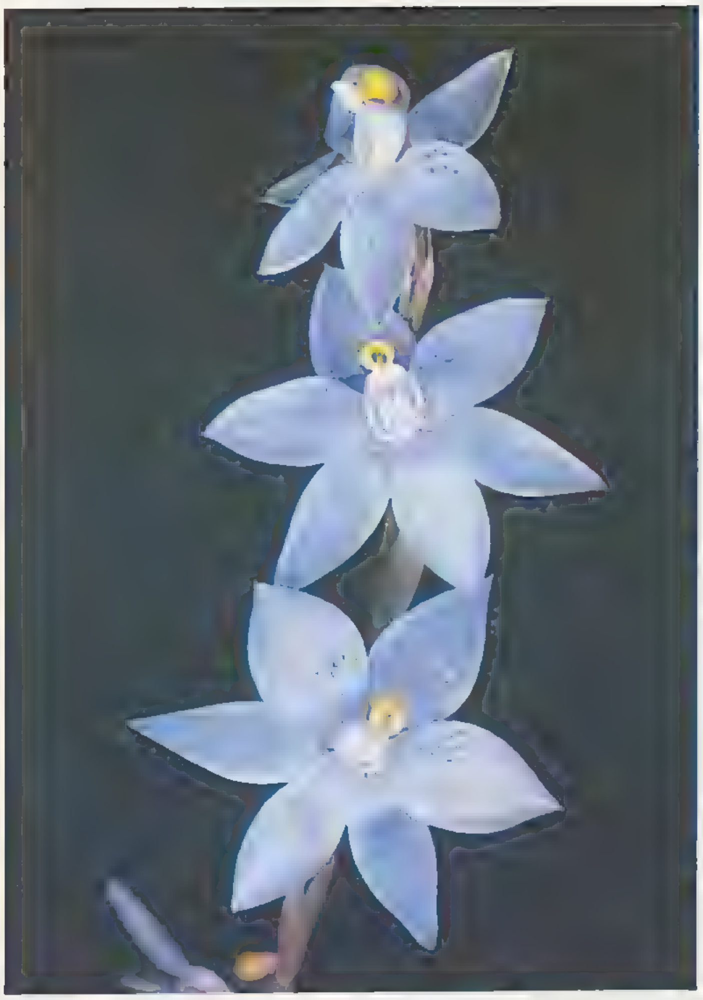


Fig 5. *Thelymitra ixioides* x *T. pauciflora.* Photographed by R. Bates, Knitpo South Australia.

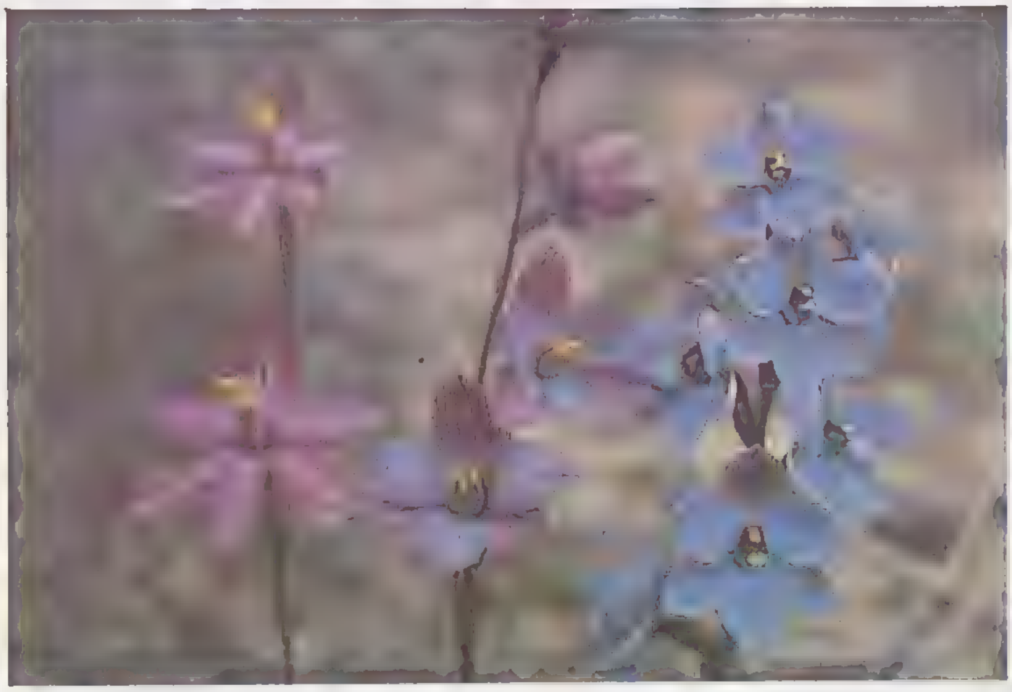


Fig 6. *Thelymitra campanulata* x *T. spiralis* (centre) with its parent species on each side respectively.
Photographed by A. Brown near Northhampton Western Australia.

I also use cork and hardwood strips about 2cm wide for the smaller species, *Papillilabium beckleri* and *Schistotylus purpuratus,* for although these grow in decidedly damper situations than the typically dry-growers, they seem to prefer a smooth, moss-free host. However, I do water them more often than the dry-growers and provide shadier conditions. I would advise against the use of epiphytic moss with such relatively small orchids to avoid the possibility of crown rot caused by excessive moisture retention.

Ironbark totems are also very good and I am pleased with the way in which most Sarcanthinae take to this host. *S. falcatus* likes it, and I also have *S. australis, S. hillii, P. tridentata* and *R. divitiflora* growing well on ironbark. Fibrous, open treefern fibre from the Soft Treefern (*Dicksonia antarctica*) suits some species but I do not use it much for Sarcanthinae species. Its advantage is its moisture holding capacity, so it is definitely not suitable for the drier growing types, but its disadvantage is that it tends to retard root growth, at least initially. It seems to me that the orchid has to get used to the ph of treefern but that once it adjusts to this it will usually do well. *S. falcatus* and *S. olivaceus* will grow reasonably well on treefern. New Zealand's *Drymoanthus adversus,* a decidedly wet-growing orchid, I can grow only on treefern. Some of the larger tropical species, *Robiquetia wassellii, R. tierniana, Pomatacalpa macphersonii* and *Phalaenopsis amabalis* will also grow well on fibrous treefern. The best plant of *Peristeranthus hillii* I have ever grown lived for many years on a treefern totem until I killed it by using Copper Oxychloride as a preventative fungicide about eighteen months ago. Lengths of paperbark about 4 - 5cm in diameter are also good for the larger growing species, especially *S. falcatus, R. divitiflora* and *P. hillii.*

It is difficult to advise exactly on watering of these species but they do require watering more often than orchids in pots. So much depends on the weather conditions and the orchid house environment, as well as the type of host chosen. The maintenance of a humid but bouyant atmosphere is again stressed, as accurate watering for the species in question will not overcome the problems of a stale, dry atmosphere. The air must be kept moving, gently, and adequate water must be available for evaporation into the air. I use gravel on the pathways and sawdust under the benches. The establishment of other ornamentals under the benches will also help but may encourage snails and other pests. Many of these types of orchids seem to grow well hanging underneath the benches, beneath pots of other orchids, where the atmosphere is just that little more shaded and cool. Regular damping down of the paths and the ground under the benches will help in creating conditions that are just right.

The most important consideration in the successful cultivation of the epiphytic Sarcanthinae lies in the establishment and maintenance of a healthy root system. Apart from the general principle of providing a cool, humid and well ventilated environment, the health of the roots seems to be mainly dependant upon watering, both frequency of direct watering, and the quality of the water used. In my experience, the most commonly encountered problem with these orchids is root die-back, where roots progressively shrivel and die, often along their entire length, commencing with a collapse of the root tip. The drier growing types seem to be more prone to this malady but it is by no means restricted to them alone. I have always suspected that dissolved salts in domestic water supplies are responsible for this, and the situation is aggravated where water is applied in excess of the plant's requirements. This is especially true during warm weather, when the grower tends to water more frequently in the mistaken belief that such watering will help the plant. Certainly, there are some species which require frequent watering, most notably the cloud-forest dwellers, but most are able to withstand periods of warm, dry weather quite well. In nature, they may have to go for many weeks without direct rainfall, and it is just during these warm dry spells when rain is least likely to fall. They are adapted to this and, indeed, it is possible that at least some of them require periodic dry spells for continued good health. In fact, my watering programme tends to reflect prevailing weather. I water a lot during damp weather, making sure my plants get thoroughly wet and stay that way for the duration. As the weather clears, I allow the plants to dry out and cut back on watering. This is not to say you should not water at all during dry spells, for the orchid house environment is not a natural one and some compensation is necessary at times. I only make the point that more plants are killed by overwatering than underwatering.

Getting back to the discussion at hand, I believe that with each successive watering a very small amount of salts is deposited on the plant as the water evaporates. Certain mineral salts are beneficial, that is why we feed our orchids, but these epiphytes are not gross feeders, especially those which prefer to grow on smooth branches, or which tend to aerialise their roots, such as *Plectorrhiza* and *Pteroceras.* The gradual buildup of salts on the root surfact is detrimental, and unless flushed away by sustained rain may cause root damage. The message in all of this? Natural rain is the best thing in the world for your orchids.

With regard to feeding, these orchids do not need much and overfeeding will give trouble. I am not a regular feeder, and when I do remember to feed I use Nitrosol or Fish Emulsion at no more than half strength. An occassional half strength application of Aquasol is also beneficial. I make sure the orchids are still damp from watering the day before to avoid burning.

The levels of light required for these epiphytes is variable but the drier growers do prefer brighter conditions. I am currently growing these under about 70% shade. The others may be grown in considerably more shaded conditions and most do well under quite heavy shade, almost as shady as you like, short of real darkness. However, flowering may be retarded under excessive shade, but this is something with which the grower must experiment. The general rule for all orchids is to grow them under as much light as they will stand without showing any ill-effects. The symptoms of too much light are a yellowish-green coloration of the leaves, in fact a bleaching effect, and smaller than normal leaves. I think for these types of orchids it is best to err on the shady side to avoid this, for most prefer shaded positions in the wild and nature is the best guide.

It is important to see these orchids in the bush to assess their growing conditions. Note if they are growing on main limbs or on peripheral branches and twigs; are the roots growing into mosses and ferns or are they exposed; does the general area strike you as a wet environment or a drier environment; are the orchids favouring heavy shade or reasonable light; is the area near a creek or on a hillside.

The answers to these questions will guide you.

Lot 2, Howes Rd
East Kurrajong via
Wilberforce 2756

The Ira Butler Trophy Committee 1985

This year entries were received from the following societies and groups:

A.N.O.S. Sydney Winter Show — W. and J. Upton *Den.* Harold Hirsch
Spring Show — L. Montouro and M. McTiernan *Den.* Eureka
A.N.O.S. Central Coast Spring Show — C. Arnott *Den.* Wonga
A.N.O.S. Wollongong Spring Show — A. Beileiter, *Den.* Bardo Rose
A.N.O.S. Warringah Spring Show — W. and J. Upton, *Den.* Hilda Poxon
A.N.O.S. Far North Coast Spring Show — T. and B. Gregory, *Den.* Wonga
Orchid Club of S.A. Winter Show — R. and P. Rankin, *Den.* Hilda Poxon "The Lodge"
Spring Show — L. and M. Nesbitt, *Pterostylis* x *ingens*
N.O.S.S.A. Spring Show — B. Bates, *Diuris* Pioneer
Tasmanian O.S. Spring Show — L.A. Bourke, *D.* x *delicatum*
O.S.N.S.W. Winter Show — R. Lin, *Den.* Gloucester Sands
Spring Show — S. Batchelor, *Den.* Star of Gold

Champion Australian Native Orchid Hybrid 1985

Mr. Bob Bates of the Native Orchid Society of South Australia

***Diuris* Pioneer**

This was a beautiful orchid, very well grown and presented potfull in perfect show condition. The flowers were creamy yellow with red-brown splashes and markings, PIONEER is a free flowering hybrid of *Diuris* longifolia x D. maculata, and larger than both.

***Diuris* Pioneer**

[Reprinted from the Bass Group ANOS Newsletter]

Terrestrial Orchids of the Rocky Cape National Park

by Barry J. Dudman

This is Tasmania's smallest National Park, spreading from near Boat Harbour, west to Rocky Cape 12km, a total area of 3000 ha. The Park was proclaimed in 1967 and enlarged in 1975. The rugged quartzite hills are covered by low heathlands and stunted *Eucalyptus nitida* plus *Banksias* and *Leptospermum* etc., and a wealth of orchids.

I was fortunate to go on numerous outings with the late John Firth in the 50's and early 60's; and this area was popular. A publication by the Queen Victoria Museum "Flora of Rocky Cape" by M.J. Firth in 1969 listed plants in a 220 acre area between two branching roads — one terminates at the old jetty and the other west to the shacks area. In this area he listed 46 species of orchids including two rare endemics in *Caladenia echidnachila* (Tailed Spider Orchid) and *Prasophyllum brachystachyum.* (Tiny Leek Orchid).

In the spring of 1973 I commenced a new set of records listing localities where various orchids have been found; having given all my prior recordings to M.J. Firth for his 'Native Orchids of Tasmania' book published in 1965. (After this I had a few years break from orchid recording). Areas such as Rocky Cape I visit as frequently as monthly and continued recording shows interesting seasonal variation of flowering times, regularity of flowering, result of fire, etc.

Within the Park I record in three sections:— East of Sister's Creek, West of Sister's Creek to Anniversary Point, and Rocky Cape. I have recorded 58 species in the National Park, and know of others that have eluded me such as *Caladenia menziesii* or recently found *Orthoceras strictum* etc. I am reluctant to tell people where some species are found, as they often are removed, such as a beautiful colony of several hundred plants of the pure yellow *Diuris longifolia* which have seen every year since 1974 in October or November, the colonies of *Sarcochilus australis* in Circular Head localities; or *Caleana major* (The Flying Duck Orchid) at various sites such as Smithton, Sister's Beach, Gowrie Park, Calder, Wynyard. It is good to be able to re-visit these locations and see these gems of the plant world at their best most years, in their natural environment, hoping they are safe.

Getting back to Rocky Cape National Park there is one small location I like to visit. It is a rocky spur running westerly off Flagpole Hill. There are small pockets of soil in the rocks which are dust dry in summer, and in winter mosses thrive on the steep side; while on the flat top, beneath the stunted *Leptospermum, Epacris, Calytrix, Banksia, Acacia,* etc., there is more soil and leaf humus cover. Visits by possums or rabbits disturb the soil, but they leave their droppings as compensation! The area would be about 100m long and about 20m wide and I have recorded 21 species there. They are:— *Eriochilus cucullatus, Diuris longifolia, Prasophyllum brachystachyum, Microtis unifolia, Glossocia major, Corybas aconitiflorus, Acianthus exertus, A. reniformis, Pterostylis parviflora, P. longifolia, P. nutans, P. nana, P. pedunculata, P. plumosa, Caladenia catenata, C. patersonii, C. dilatata, Thelymitra megcalyptra, T. rubra, T. ixioides, T. aristata.* Experience tells me the likings of each species which greatly assists the field excursion results. I know the *Diuris, Caladenia, Thelymitra* like the sunny north side, while on the shady side I would find *Pterostylis, Corybas, Acianthus.* Others prefer the heath/scrub protection.

A stone's throw away from my favourite spot I have recorded *Pterostylis pedoglossa, Acianthus caudatus, Thelymitra retecta, T. venosa, Prasophyllum odoratum, P. fuscum, Calochilus robertsonii, C. paludosus, Corybas unguiculatus.*

This is just one select area as as example. I could make similar lists for such areas as Cathedral Rocks, Anniversary Point, Two Sister's Hills, a couple of swampy areas at Sister's Beach.

The other thing I like about Rocky Cape is that I can find an orchid in flower each month of the year, and any day I am wandering in the Park. Being a member of Burnie Field Naturalists Club and handling our shack bookings for many years, I visit the area at least once per month. It is just a matter of knowing what to search for; where and when. The spring months are the most rewarding for orchids and the magnificent colour of our heathland plants at their best. A few years ago, a day outing in October with Mr. & Mrs. Woolcock of Victoria, and another year with Mr. & Mrs. Maynard Pocock from South Australia, resulted in over 20 species recorded in flower. Then in summer a search in the swamp areas may only find a couple out in flower — and a few snakes for good measure!!

So You Want To Be A Breeder

by Rob Trevenar

Many growers would like to breed their own orchids. The thrill of seeing a seedling flower for the first time is intensified if you have bred the plant yourself.

Because of the interest in breeding native orchids that existed within ANOS, it was decided to set up a breeding program. The Wollongong Group program aims to enable our members to improve and expand their collections at a low cost. The program has several threads. The most important is the breeding of rare and endangered species. Members, and on occasions interested non-members, have provided us with the opportunity to breed several rare species and superior varieties of desirable species. We are also breeding cool growing Australian hybrids, cool growing New Guinea hybrids, warm growing Australian and Australasian hybrids, especially dendrobiums of the *Spatulata* section as well as crossing cool growers with warm growers in an attempt to combine the cool growing characteristics with the lasting qualities, different shapes and colours of the warm growers.

The advantage of involving a large number of members in the program is to widen the genetic base we have to work with. For the same reason, we are of course, always keen to get material from people outside our society.

We are very fortunate to have a member who does an excellent job of flasking our plants. The success rate with the flasking is very high. Seedlings in the flask are grown without heat. When ready plants are deflasked and grown on by several of our members, some of whom are growing our warm growing crosses without heat successfully so far, as an experiment. When ready the seedlings are sold to our members at a low cost. Plants surplus to our needs are sold to non-members.

With any breeding program careful records need to be kept. The person making the cross fills in a form with the following details:— the date the cross was made, the names of both parents and their owners, the person doing the flasking and the date of flasking. This, plus details on germination and other relevant information is entered into our breeding records. These are kept in duplicate by two members of the breeding committee as a cross check and to guard against the loss of our records. Our records allow us to quickly find out the results of our previous crosses to enable us to plan future crosses.

We have, of course, experienced some problems. In the early stages we had quite a few losses. Many were due to the seedlings being grown too warm after deflasking. This has been mostly overcome by deflasking in spring and growing the seedlings cool at least until the next winter. When deflasked most of the agar is gently removed from the roots and the plants placed in community pots with no attempt to separate the individual seedlings. In this way plants are less likely to suffer root damage and seem not to experience any setback. We are now releasing seedlings to our members at a more advanced stage in order to cut disappointing losses.

Once our program is sufficiently in the black, which should be in the very near future, free plants will be distributed to our members from time to time.

47 Cox's Ave.,
1 September, 1985 Corrimal 2518.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the R.H.S. from lists in the Orchid Review September — November 1985)

NAME	PARENTAGE	REGISTERED BY
DENDROBIUM		
Golden Glory	fleckeri x tetragonum	J. Purvis
Golligosh	schneiderae* x monophyllum	W.T. Upton
Wesley Pink	Virginia Jupp x teretifolium	W.T. Upton

* First occurrence as a parent in hybrid registration.

MONA VALE SPRING SHOW 1985

by M. McTiernan

The 11th annual Warringah Group Spring Show was held at Mona Vale over the weekend of 7 & 8 September, 1985. Attendance for the show was approximately 1,300 not counting pensioners and children who were admitted free.

I look forward every year to this event since it is an opportunity to immerse oneself in native orchids for an entire weekend. The fragrance is often overwhelming. The orchids are subjected to the closest inspection. However most of all it is an interchange of ideas with new acquaintances being made and old ones renewed. Topics such as directions in hybridising, cultivation and fertilisation are discussed at length.

The show was held in fine weather but, perhaps because of our severe winter, most growers reported that flowering was later than usual this year which meant that the quantity of plants benched was lower than expected. However this was well compensated for by the quality of the flowers. The late flowering meant that, except for a single plant in the prize winning massed display of John Roberts and Ron Gallagher, there was not one *Den. falcorostrum* to be seen! The number of plants of those show favourites *Den. X delicatum* and *Den. X gracillimum* was also low.

However, it was pleasing to see the large number of entries in the 'Best Hybrid Seedling — First Flowering' category. This keenly contested section was won by Wal and Jill Upton who, as did Chris Arnott, collected many prizes in recognition of the high quality of their entries. One successful addition this year was the 'Cultivation Advice' table where Lou Montuoro gave practical advice to many visitors. I feel that this innovation is likely to become a permanent feature of the show.

Two plants which caught my eye were a fine *Den. tetragonum* from Sid Batchelor and Rhinochilus Dorothy from Wollongong Group. The tetragonum carried 5 — 7 flowers per spike with 2 — 3 spikes per cane. The flowers were of a good shape, size and colour. With stud plants like this it is no wonder Sid's hybrids are of such a high standard.

The Rhinochilus was captivating. This specimen is the most successful that I have seen in capturing the charm of *Rhinerrhiza divitiflora* yet giving added substance and shape and prolonging flowering beyond a single day. It is interesting to speculate on the outcome of crossing this plant back to a good clone of *Sar. hartmannii.*

Winners of championship prizes were as follows:

Class	Plant	Owner
Epiphytic Species	*Den. tetragonum*	S. Batchelor
Terrestrial Species	*Caladenia patersonii*	P. Dunstan
Hybrid	*Den.* Hilda Poxon	W. & J. Upton
Species Specimen	*Den. teretifolium*	L. Montuoro
Hybrid Specimen	*Den. x delicatum*	E. Webeck

Den Hilda Poxon Champion Hybrid section, owned by W.J. Upton.

In summary, congratulations are due to the show committee for a job well done. Whilst staged by Warringah group many exhibits also came from members of other groups including Gosford, Sydney and Wollongong. This level of support which helps to maintain this show's position as being viewed by the public as the premier native orchid show of the year, is most pleasing.

See you at Mona Vale in 1986!

10 Cameron Ave.,
Artarmon.

12 September, 1985

Editorial Policy—Some reflections

by J.J. Betts

Quite apart from the obvious need to produce a good-looking journal with accurate spelling, readable print and appropriate illustrations, the editor of this particular journal has to strike a balance of content between the science of botany and the technology of orchid growing. The former has been represented in *The Orchadian* by writers like Cribb, Lavarack, Reeve, Howcroft and Clemesha — who have all named new orchid species in this journal thus making it vital to orchid taxonomists throughout the world. The technology of orchid growing (that is, horticulture) on the other hand is vital to the amateurs who probably make up the majority of readers. Paradoxically, quality articles for these readers are the most difficult to come by. In recent years the best examples of what is needed have been contributed by writers like Ted Gregory and Michael Harrison who have combined vast practical experience with literary skill — a rare combination which the wise editor must seek out, encourage and cultivate. Some would see this as his most vital task.

The Orchadian's reputation in the field of botany depends upon the taxonomic determinations and new species it publishes. From this point of view then, the editor's decision on what to publish may be his most vital task. It certainly requires the assistance of expert "referees"; but this in no way diminishes the editor's own responsibility. Reflecting on this I would say it is the most delicate of all the editorial tasks. To reject an author's work on the basis of a referee's comment may offend the author. To disregard the referee will also offend. So I confine my reflections to this delicate problem.

A writer, whether he be a professional botanist or an amateur with extensive field experience, may conceive the need to classify an orchid as new to recorded botanical science. It may be a new genus, species, sub-species or variety. It may be a natural bybrid between two species growing in the wild. How does he reach a conclusion or "proof" as to the appropriate classification of this apparently new entity? An amateur may feel intimidated or discouraged by the sheer complexity of the research or study of references in the literature and in herbariums that will be necessary, especially if the herbarium material is not available in his own country. He may therefore give his data to a professional botanist to make a decision — generally known as a taxonomic "determination". If it is new, the entity is then described according to traditional botanical procedure, including a brief "diagnosis" written in the international language of Latin to facilitate recognition throughout the world. This procedure has an air of being authoritative and final. But is it? When a botanist publishes the new name and description in this very formal way, the convention is that it must be done in an appropriate journal by a "botanist of repute"; but other experts may disagree. For example, another botanist of repute may challenge the determination by showing that the so-called new species is in fact the same as an herbarium specimen already described and named by another author. This has happened often and is no disgrace to the author or publisher.

There is a vagueness about the acceptance of taxonomic decisions. Some time may elapse while the challenger assembles the arguments against the new determination and publishes them. Botanical literature affords many examples (Schlechter versus Kranzlin, to mention but one example). Thus it seems that nothing is absolutely certain; there is no final authority — no court of appeal.

The editor must keep this in mind whenever he or she receives an article containing a taxonomic determination. It is comforting to be able to refer such a paper to a referee who can express a professional opinion on the merits of the arguments; but in the final analysis the editor must decide whether to publish the article or not. If the referee comments to the effect that he does not agree with the author's conclusions but adds that the author is, of course, "entitled to his opinion", is this sufficient reason for rejecting the article? I think not — especially when it is clear that the author has argued logically and has admitted that he cannot prove every step in his argument. In this case he is putting forward an hypothesis that may be later proved right or wrong; or just "accepted". After all, this is the procedure of science. Without hypotheses to be tested there can be no advancement in our knowledge. On the other hand, if an author's argument is not presented logically or if it contains statements that are clearly false but are presented as if they were statements of fact, then the editor would be justified in rejecting the article or at least suggesting amendments.

A few years ago, at an international symposium of orchid enthusiasts (both amateur and professional botanists) held in Sydney, a well-known local "orchid buff" rose to his feet to make a comment and he prefaced his comments by saying "We all know that botany is not an exact science ..." There was an immediate objection from one of the professional botanists who rightly pointed out that botany is certainly a science just like physics, chemistry, biology and the rest. This could have led to a really interesting (to me) philosophical discussion of the nature of science; but the chairman deftly blocked this and brought the meeting back to the main topic of the session. No doubt the chairman's aim was to keep to the limited timetable. So it was never pointed out to the orchid buff that his reference to "an exact science" was quite foolish and irrelevant if it meant that a science should consist solely of undisputed truths or facts. In physics the atom was once defined as the ultimate indivisible particle of matter; but nowadays everyone knows the so-called "atom" **is** divisible! The fact that further discoveries have been — and will continue to be — made in atomic physics, does not make physics an inexact science. It merely points up the fact that any science proceeds on the basis that there is always more to be discovered. This philosophical concept is too often lost sight of, even by scientists. So I am suggesting that it is fundamental to editors.

During my editorship I adopted this view as editorial policy for *The Orchadian* and was gratified to receive a letter from a scientist in Europe who considered that *The Orchadian* is the only orchid journal in the world that could match up to *Orquidea* (Mex.) the journal of the Asociacion Mexicana de Orquideologia A.C., edited by Eric Hagsater and a committee that includes Phillip Cribb and Robert Dressler.

To conclude my reflections on editorial work, let me turn to the Australian scene and two important papers by S.C. Clemesha which cost me a great deal in time and worry. Both before and after their publication these articles were strongly criticised (verbally) as to the validity of their conclusions. One botanist told me they damaged the image of *The Orchadian* as a reliable journal! The first of these two articles was "A Review of *Dendrobium bigibbum* Lindl." (*Orchadian* 6:2; pp 27-33, December 1978). The second was "A Review of *Dendrobium speciosum* Sm." (*Orchadian* 6:11, pp 247-262, March 1981). Both articles are lengthy and complex in the eyes of many readers. After publication I waited patiently for these verbal criticisms to be submitted for publication. I waited in vain, wondering whether Clemesha's findings were ever to be confirmed or denied in print. I thought it was important. After all, the first article had eliminated the name *Dendrobium phalaenopsis* and showed that that entity should henceforth be known as *Dendrobium bigibbum* Lindl. subspecies *laratensis* S.C. Clemesha. When this determination was verbally questioned by a member of the large audience at the Orchid Symposium held as a satellite function of the 13th International Botanical Congress (Sydney, 1981¼), Dr P.S. Lavarack verbally confirmed Clemesha's determination; but so far as I am aware the international orchid world, including the RHS registration authority, goes on referring to "D. phalaenopsis" as if it were a valid species. I console myself however with the reflection that my decision to publish that article was clearly justified. As to the second article my observations of my own plants (specimens of the six varieties distinguished by Clemesha) seem to support his findings. Although I am not qualified to prove the correctness of these determinations I have, as yet, no evidence to the contrary after five years; and I therefore regard my decision to publish as being well vindicated even if at some future time Clemesha is challenged.

As a matter of interest it should be noted that of Clemesha's six varieties of *Dendrobium speciosum*, the species variety was determined by Smith (1804), three were determined by Bailey and confirmed by Clemesha; a fifth was named by Clemesha as var. *pedunculatum* and recognised in M.A. Clements's "Preliminary Checklist of Australian Orchidaceae" (National Botanic Gardens, Canberra, 1982). The sixth variety distinguished by Clemesha, var. *capricornicum*, was not published until September 1982 (*Orchadian* **7**: 5, pp 103-106) and presumably this is the reason why it did not appear in Clements's 1982 Preliminary Checklist.

My conclusion is that while editors should apply critical analysis to the articles they receive and may need to refer taxonomic articles for criticism by experts, they must also take great care to ensure that they do not arbitrarily suppress controversial papers just because the author has not presented "all possible data" and has not waited for "an unobtainable perfection."

*The emphases (italics) are mine — J.J.B.

March 1, 1985

33 Memorial Ave,
St Ives, 2075.

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ANOS Groups and Affiliated Native Orchid Societies.

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- **Port Hacking Group** — Tel: (02) 524 9996. Meets 8 p.m. 4th Tuesday each month at Community Hall, Gymea Bay Road, Gymea.
- **Sydney group** — Tel: 635 8769 (Neil Finch) Meets 8 p.m. 3rd Friday each month at Lady Game Community Centre, Moore Avenue and Bradfield Road, West Lindfield.
- **Warringah Group**— Tel: (02) 99 2468. Meets 8 p.m. 2nd Thursday each month at Thomas Vickers Memorial Hall, Cnr. Pitt and Grainger Roads, North Curl.
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- **Far North Coast Group** — Tel: (066) 24 1023. Meets 1st Thursday each month at Ballina High School, Burnett Street, Ballina.

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- **Bass Group** — Tel: (004) 29 3198. Meets 8 p.m. last Thursday each 2nd month at Ulverstone High School, Walker Street, Ulverstone.

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- **Darling Downs Group** — Tel: (076) 35 8627. Meets 7.30 p.m. 3rd Friday each month at Technical and Further Education Centre, Old Empire Theatre, Neil Street, Toowoomba.
- **Native Orchid Soc. of Queensland (Associated)** — c/o P.O. Box 159, Broadway Queensland.4000. Meets 8 p.m. 1st Friday of each month at Bread House, 49 Gregory Terrace, Brisbane.

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- **Native Orchid Society of South Australia (Associated)** — Tel: (08) 278 2917. Meets 4th Tuesday each month at St. Matthew's Hall, 67 Bridge Street, Kensington.

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- **W.A. Native Orchid Study & Conservation Group (Inc.) (Associated)** — Tel: (09) 398 3578. Meets 3rd Wednesday each month at Kings Park Board Admin. Centre Theatrette, Frazer Road, Kings Park, West Perth.

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Letter to the Editor

Dear Sir,

P.S. Green's article on 'Orchids of Norfolk Island' contained two errors in distribution.

It stated *Bulbophyllum argyropus* — as *B. tuberculatum* was recorded from MacPherson Range on the Queensland/New South Wales border (Orchadian 6, p. 136, 1979). In fact it was recorded in that reference from Coopernook Creek in the eastern Dorrigo area. It has since been found in other localities within about a 10km radius of that area. It is unknown from elsewhere on the mainland to my knowledge, but is likely to be found in localities of similar altitude in northern N.S.W. and possibly southern Queensland. It is not a horticulturally attractive orchid and it is difficult to cultivate.

P.S. Green gives the distribution of *D. macropus* ssp. *gracilicaule* as coastal N.S.W. and Southern Qld. It actually extends to the ranges including the Bunga Mts. It is also found in north Queensland — ranges and highlands. The one clone I have from there differs from my N.S.W. plants of the sub-species. Its stems are shorter and thicker and its leaves are shorter and broader. It is about mid-way in habit between N.S.W. plants of this sub species and ssp. *howeanum*. The plant flowers 4-6 weeks earlier than my N.S.W. plants. The flowers are slightly smaller than N.S.W. plants, but otherwise seem the same. Like N.S.W. plants I have not been successful in selfing the plant, though it crosses easily with other species and clones.

Yours faithfully,
S. Clemesha

Central Coast Group A.N.O.S. will be holding their Annual Spring Show on Saturday and Sunday, 13th and 14th September, 1986 at the Scout Hall, Gertrude Place, Gosford. Open 10 a.m. to 4 p.m.

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The Taxonomy Of *Spathoglottis* Blume

by N.H.S. Howcroft

The genus *Spathoglottis* Bl. (Orchidaceae) contains species with considerable horticultural potential. These terrestrial orchids have been widely cultivated for a long time in Southeast Asia (Teoh Eng Soon 1980) and quite a few beautiful hybrids have been produced among them (Holttum, 1953; Henderson, 1956). A number of the species have a reputation for being difficult to identify and the genus is still regarded by botanists as taxonomically confused (Cribb and Tang, 1982). Such confusion has prevented the registration of many hybrids as they are unacceptable for registration without the correct identification of their parents. This problem hinders or prevents progressive scientific breeding and horticultural exploitation and this, in particular, applies to Papua New Guinea which has a horticulturally valuable genetic resource in *Spathoglottis* species. As far as is known only one hybrid, involving a Papua New Guinea species, has been registered although at least three hybrids are known to exist.

This paper reviews the status of the taxonomic situation with the genus and provides a brief critique on the characters which can be used to distinguish the species.

Description of the Genus

Terrestrial herbs, c. 20 to 200cm tall. Roots long, fleshy and pubescent. Rhizomes, with few exceptions, short. Pseudobulbs ovate, elliptic or pyriform, sometimes depressed; with few to many articulations. Leaves long, linear to linear-lanceolate, acuminate, many nerved, plicate, often strongly ribbed, stalked, persistent or deciduous. Inflorescence few to many flowered racemes on erect scapes, leafless except for sheathing scales, axillary to a basal leaf. Floral bracts often large and persistent, in some small and short-lived. Sepals and petals nearly equal, free, spreading. Labellum more or less articulate at the base of the column, concave at the base, trilobed, the mid-lobe contracted at the base and bearing a prominent, divided callus or two calli. Column erect, free, more or less dilated or winged towards the apex. Anther terminal, lid-like, two celled. Pollinia eight, waxy, with short caudicles. Ovary and pedicel cylindrical, glabrous or pubescent.

Distribution: About 53 described species from Northern India, South China and Indochina to Micronesia, Malaysia to New Guinea, New Britain, the Solomons, New Caledonia, Vanuatu, Fiji, Samoa, Tahiti and Northern Australia. (Refer to Figure 1.).

Ecology: The genus is represented by species from sea-level to around 3,000m above sea level. The number of species diminishes with altitude. The species are found in grassland situations and disturbed areas such as land slips and partly exposed rock faces and road cuttings. In the coastal regions the species may be found along river and creek banks, edges of beaches, on rock faces of coral islands as well as in grasslands around areas of thermal or volcanic activity.

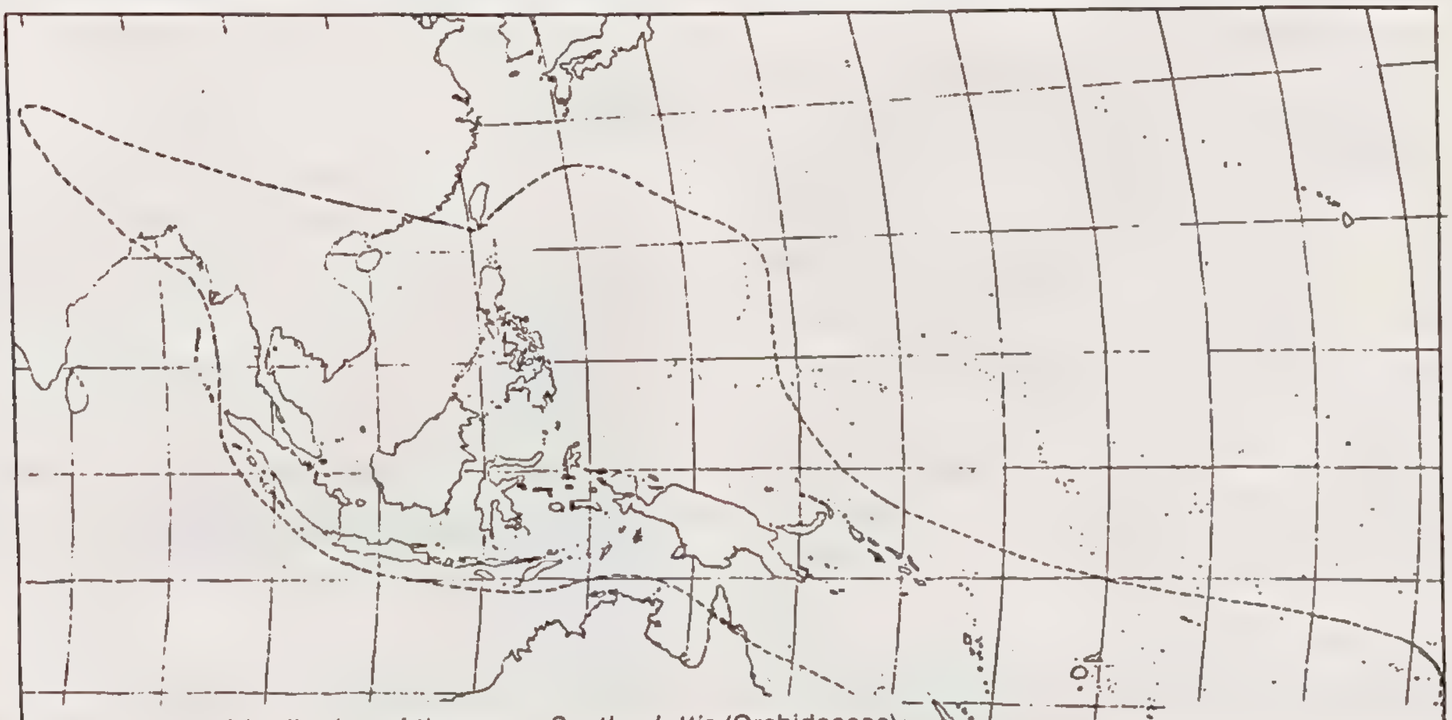


Fig. 1: Distribution of the genus *Spathoglottis* (Orchidaceae) ------- — approximate only.

Taxonomic History

General: The first *Spathoglottis* species appears to have been discovered in the 18th century. It was described as *Angraecum terrestre primum* by Rumphius in 1750. This name was not upheld and the generic name *Angraecum* was later given by Col.Bory de St. Vincent in 1804, in his "Voyages", to a group of monopodial orchids found in Madagascar and Africa. It is the earliest genus of the Sarcanthoid Madagascan and African orchids and is still recognised today.

Spathoglottis was described in 1825 by Blume for *Spathoglottis plicata,* a species then known only from the Indonesian region. Just prior to and for the next 36 years examples of taxonomic confusion presented themselves and a number of *Spathoglottis* taxa were referred to new or other genera - *Limodorum* ('aBillardiere, 1824), *Bletia* (Gaudichaud-Beaupre, 1829), *Paxtonia* (Lindley, 1838), now regarded as a peloric form of *Spathoglottis,* and *Pachystoma* (Reichenbach, 1861).

It is believed that this early history of taxonomic confusion was due to inadequate generic description as the habit and floral forms, as we view them today, indicate that the genus can be broken up into several sections. Literature research has so far not revealed that this has been done. However, such research has revealed that Bentham and Hooker (1883) did recognise such differences and divided the genus into two series based largely on plant habit. These were 1. Elatiores and 2. Tenuiores. Schlechter (1912), in his work on the genus in German New Guinea, also pointed out that the genus could be divided into two groups based on vegetative characters, but he did not elaborate further.

Although the state of the art has since improved for the genus it still remains taxonomically confused today, with the status of a number of taxa still in doubt as the following estimated totals for the number of described species indicate : 46 species (Halle, 1977), 53 species (Van Royen, 1979) and 40 species (Bechtel, Cribb and Launert, 1981). The basic problem in the taxonomy of the genus was well summed up by Oakes Ames (1915) in part of his treatment of the orchids of the Philippines. In his words 'The distinguishing characteristics are not clearly understood, consequently it is difficult to differentiate between the species which have already been described'.

New Guinea. "There are few genera of the Orchidaceae in which the individual species have been confused so much as in *Spathoglottis* Bl. This is attributed to their usually being very closely related and therefore not easily distinguished. On the other hand it appears until now, that we have not always recognised their more important characters and that they have been described inadequately. During my last journeys I took great pains to discover which of the characters most importance should be attached in determining the species of this genus, and I came to the conclusion that the shape and degree of hairiness of the labellum form the best distinctions, even between very closely related species. I have not been able to detect any variation in these characters in any individual species although I have examined a large number of flowers for this purpose. On the other hand, the degree of hairiness on the outside of the perianth segments is variable and is, therefore, often useless for the determination of the species." (Schlechter, 1912).

From 1886 to 1934, some thirty species and varieties had been described for New Guinea by Kraenzlin, Rogers, Schlechter, Smith and White (Appendix). Some synonymising was also carried out during this period by Schlechter (1912) and Smith (1934) which reduced this number to twenty four species and varieties. An additional species was more recently described as *S. montana* (Van Royen, 1979) and *S. rivularis* has been recently reduced to *S. paulinae* F. Muell. by Cribb and Tang (1982). Thus the present number of taxa recognized in New Guinea is twenty five.

Rogers (1925) and Smith (1929) expressed some doubts about the status of some of the species they described and it seems that Schlechter's opinion on the characters he felt were the most important influenced them to some degree in describing a new species. However, Smith in 1934, when recording *S. wariana* Schltr. for Dutch New Guinea, expressed a view, held by many, that it was almost impossible to distinguish in a satisfactory way the species allied to *S. plicata* Bl. and stated that a revision was necessary using abundant material from a wide range of localities and flowers preserved in alcohol. He also believed that *S. wariana* Schltr. and *S. papuana* Bail. var. *puberula* Schltr. could not be maintained as separate species, an opinion he shared with Dr. Mansfeld who had also examined the species. Thus we have some doubts expressed on the usefulness of Schlechter's method of determination.

Critique

Plant Habit: Although Bentham and Hooker

Fig.2A

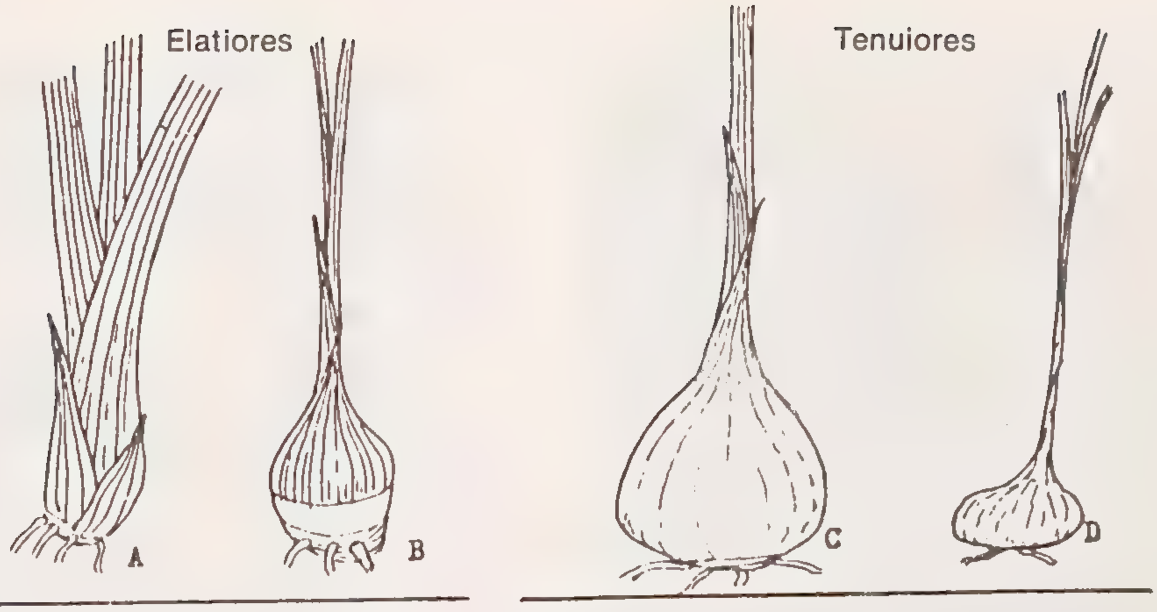
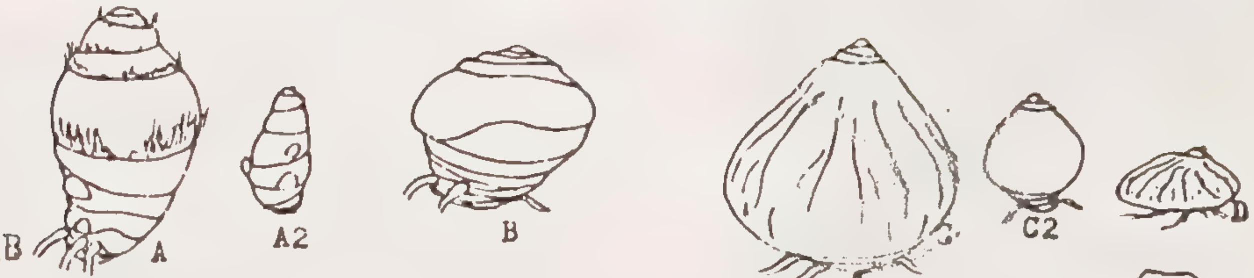
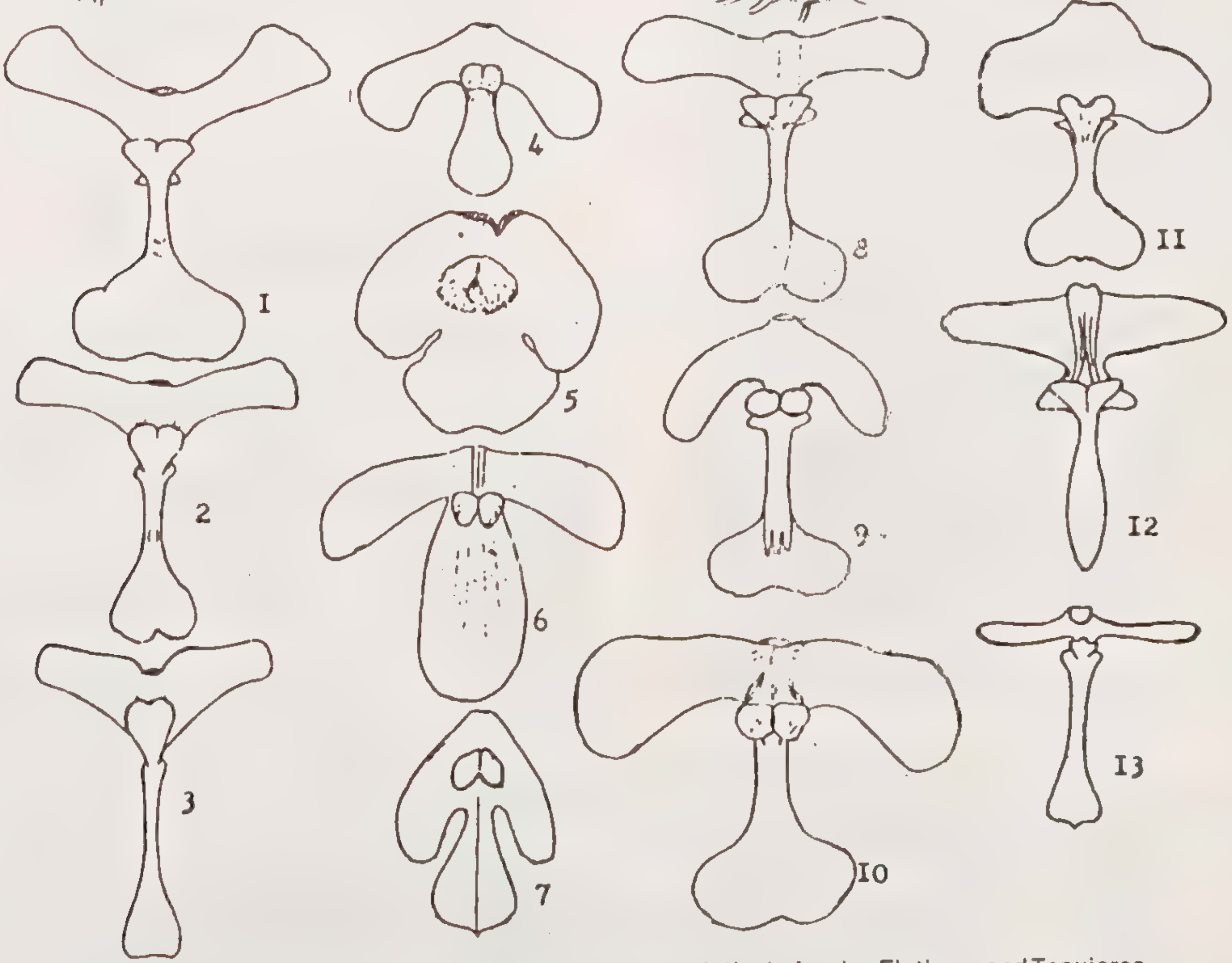


Fig.2B





Figs. 2A and 2B Pseudobulb habit (sheathing and articulation) of series Elatiores and Tenuiores.

Fig. 2C Flower labellum shapes (two rows per series).
1. *S. plicata* Bl., 2. *S. papuana* Bail. var *puberula* Schltr.,
3. *S. pulchra* Schltr., 4. *S. paulinae* F. Muell., 5. *S. petrie* Reichb. f.,
6. *S.* aff. *doctersii* J.J. Sm., 7. *S. albida* Krzl.,
8. *S. portus-finschii* Krzl., 9. *S. kenejiae* Schltr.,
10. *S.* putative hybrid, 11. *S. affinis* De Vr.,
12. *S. aurea* Lindl., 13. *S. chrysantha* Ames.

(1883) and Schlechter (1912) recognised that the genus could be subdivided into two groups based on vegetative habits as illustrated in figure 1, in many cases the pseudobulb of the species was either inadequately described or not described. In some cases the material was not available. For some of his New Guinea species Schlechter did place some importance on pseudobulb characters, for example, *S. bulbosa* Schltr., *S. kenejiae* Schltr., *S. portus-finschii* Krzl. and *S. pulchra* Schltr.

When examining the pseudobulbs of mature and young plants in the field, differences can be detected between the species, in pseudobulb shape, foliage presentation, the articulations or annulations and lastly in the size of the pseudobulbs of mature specimens. (Figs. 2A - B). Even though phenotypic variation occurs within the populations observed, there are striking similarities in these characters between populations of each species.

Although used for classification at the series level (Bentham and Hooker, 1883), it is felt that pseudobulb characters may have more to offer in the identification of the species than indicated by past botanists. Measurements of the height and diameter ratios have been made to quantify the shape of the pseudobulbs of two common species, *S. paulinae* F. Muell. and *S. papuana* Bail. var. *puberula* Schltr., to see what variation exists in and between populations of species and between species. The first species generally appears to have broadly ovate to elliptic pseudobulbs, whilst those of the latter are more conical, oblong-ovate to ovate. Regression lines (Fig. 3), plotted from the computed data, tentatively indicate that *S. papuana* Bail. var. *puberula* Schltr. pseudobulbs are proportionately taller and narrower than the other species. However, there are suggestions that some differences could be expected. The influence of natural hybrids cannot be overlooked and further data is required for these two species and the other species before a positive statement can be made.

Classification into Sections: Examples of the pseudobulb and leaf bracts of the species in the two series described by Bentham and Hooker (1883) are illustrated in figure 2A, followed below by figure 2B with the pseudobulbs without sheaths and showing the patterns of articulation or annulations. Bentham and Hooker's description for these are as follows:—

Elatiores — pseudobulbs not very thickened, often protected by the remains of fibrous sheaths; foliage large and broad; racemes many flowered with conspicuous floral bracts (Figures 2A-A, B).

Tenuiores — pseudobulbs corm-like, almost naked; leaves narrow; raceme laxely flowered; bracts small (Figures 2B-C, D).

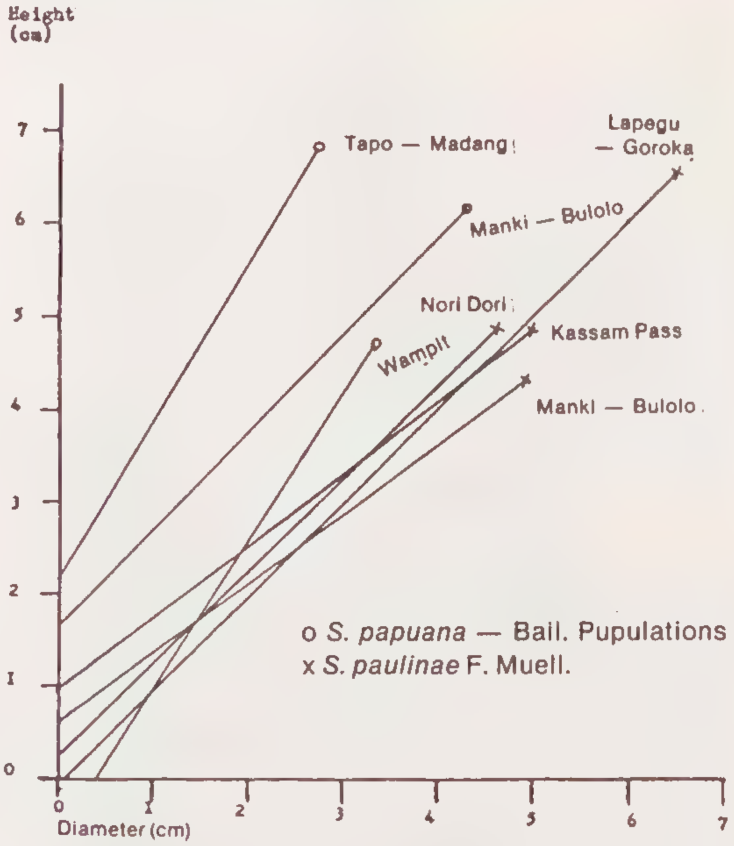


Fig. 3. Comparison of pseudobulb dimensions.

From observations of live material examined in New Guinea, the Pacific Islands and from Asian countries, there appear to be two other characters that suggest that the series could be divided into three or four sections. These are floral and articulation patterns.

In the series Elatiores, sheath type figure 2A-A is associated with pseudobulb articulation patterns for figures 2B-A and 2B-A2, and these in turn are associated with labellum patterns 1 to 3 in figure 2C. All conform with description for raceme and floral bracts. However sheath type figure 2A-B is associated with the pseudobulb articulation pattern from figure 2B-B, and in turn with **some** of the labellum patterns from 4 to 7 in figure 2C. One exception is that figure 2B-A2 is also associated with labellum pattern 6. The species with the broad mid lobe and short claws, or with lobe claw absent, appear to form a section of their own without including pseudobulb characters. They conform to the description for raceme and floral bracts in series Elatiores.

The series Tenuiores contains species that have yellow flowers as well as those with a colour range from white, pink to red, and generally conform with the pseudobulb form, sheath and articulation patterns illustrated in figures 2A-C, D and 2B-C to D.

The characteristics of the inflorescence are quite similar among the species. Generally the peduncle and racemes have small diameters; they are usually pubescent, as are the small floral bracts which wither and even fall off before the flower buds open. Most of the species examined so far are deciduous and leaf fall takes place before and sometimes after flowering starts.

In general sheath type in figure 2A-C is associated with pseudobulb articulation types in figure 2B-C and C2, and these in turn are associated with labellum patterns 8 to 10. Labellum form 10 is interesting as it is thought to be a hybrid between from 4 and 8. Its pseudobulb characteristics conform exactly with that in figure 2B-C and not with figure 2B-B. However, its infloresence characteristics tend to lean towards that of type 4 species in figure 2C. In all specimens examined so far pseudobulb articulation types figure 2B-C and C2 have not had a flattened or depressed shape such as figure 2B-D has. The latter form is associated with the yellow flowered species. Examples of the labellum patterns for yellow flowered species are provided in figure 2C-11 to 13. It is suggested here that the yellow flowered species may, because of the character differences mentioned above, form a separate section. Thus the series Tenuiores, like Elatiores, might be divisible into two sections based on differences in pseudobulb and floral characters.

To create sections for the New Guinea species in a future taxonomic revision, it may be necessary to examine a range of plant material from the Asian region, before this can be done.

Floral Characters and Variation: It is extremely surprising that Schlechter (1912) did not detect any variation in the characters he proposed as the distinctions in spite of the large number of specimens he claims to have examined.

As part of a research project to carry out a taxonomic revision of the genus in Papuasia, samples, ranging from 27 to 50 flower specimens, have been taken from populations of different species of *Spathoglottis* in Papua New Guinea. The samples are being assessed for the variation that is expected to occur within and between the populations of each species and to determine the characters which can be relied upon to make the distinctions between the species.

The degree of hairiness in the labellums of many of the species populations examined was often found to be quite variable. Although these observations need to be quantified, extremes of this variation are shown in figure 4 for *S. paulinae* F. Muell. from the Bulolo area (similar pattern emerges for the species in the Eastern Highlands), figure 5 for *S. pulchra* and figure 6 for an unidentified species from the Lelet Plateau in New Ireland. As can be seen from these examples, populations contain both hairless and hairy individuals. Given this situation coupled with extreme opposites in labellum shapes, particularly in the angle and shape of the lateral lobes (figures 4-5), it is not surprising that new species have been made from extremes of the morphological range. This continuous variation appears to exist in all the species examined so far. Other features that also show variation are the shape and position of the callus (see figure 4, top left hand specimen compared with others), presence or absence of a wart on the claw of the mid lobe and presence or absence of lobules at the base of the callus.

As present it would seem that Schlechter and others have obscured the full continuity of variation within species by breaking them into

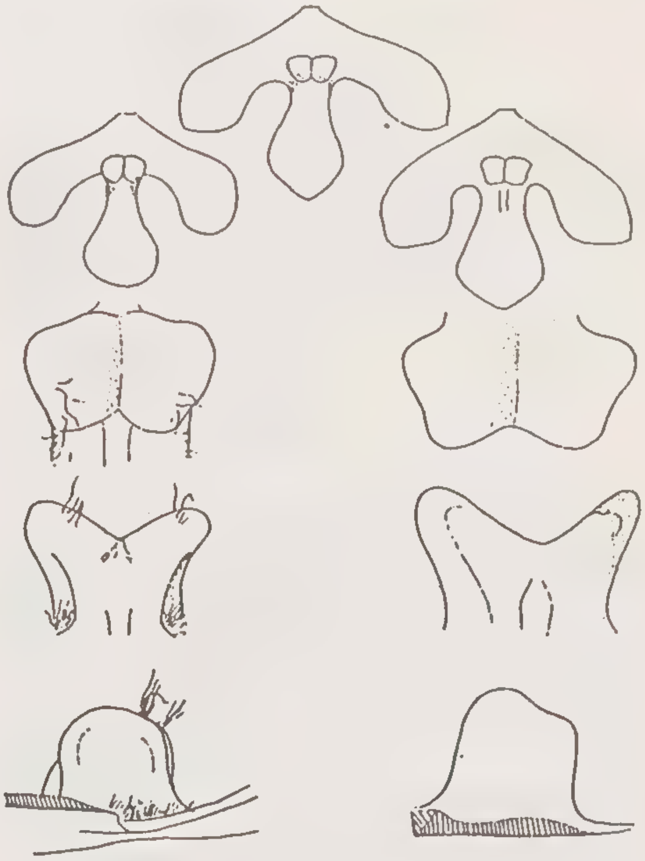


Fig. 4. Variation. *S. paulinae* F. Muell. Ex Manki rang , Bulolo — Morobe Province. Labellum, callus and hairs.

other species based on morphological distinctions whose stability have not been endorsed by the establishment of the limits of their range.

Schlechter's methods of distinction are not regarded here as being totally suspect. There is obviously a need to determine diagnostic boundaries and use these to decide whether certain species be maintained, synonymised or made subordinate to other species. To achieve this the geographic patterns of observed variation will also need to be determined.

Hybridity: The question of whether or not *Spathoglottis* species in New Guinea hybridise has been raised many times by visiting collectors. This seems to stem from the fact that species have been seen to overlap in their range. Since it has been demonstrated that hybrids can be easily made in captivity it is not unreasonable to assume that it can occur in the wild. Hybrids can cause further taxonomic confusion if they are not recognised. As Fisher (1965) pointed out in his treatment of the Alpine *Ranunculi* of New Zealand, the primary requirement of taxonomic treatments is that they allow the unequivocal identification of individual specimens, and that this must include the distinguishing of hybrids from their parent species where intergrading is interpreted as hybridity.

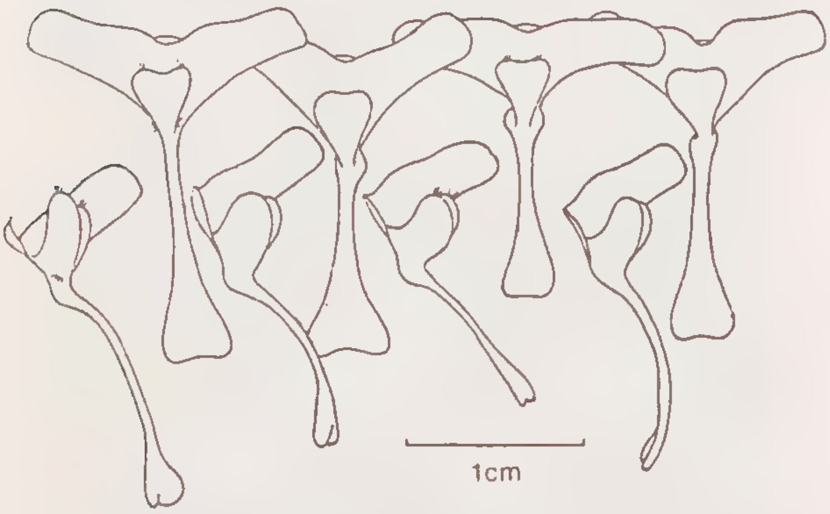


Fig. 5. Variation *S. pulchra* Schltr., Ex Open Bay region, ENBP Labellum, callus and hairs.

Three man made hybrids are known to exist. They are *Spathoglottis* x edinensis, *S. bulbosa* x *aurea* and *S. pulchra* x *portus-finschii*. The latter two provided some interesting information on some morphological characters of the parents that are likely to be of continued usefulness in the taxonomy of the genus. The latter hybrid in particular has proved to be extremely useful as its inherited characters support the belief that several natural hybrids do exist. These putative hybrids of *S. portus-finschii* Krzl. have been located recently in the gullies on the Bulolo golf course and near the top of the Kassam pass in the grasslands. The putative parents also occur in both these areas.

The first putative hybrid (Fig. 7 see also centre pages) is thought to be *S. paulinae* x *S. portus-finschii*. Tracings of the outlines of the labellums and the floral bracts of the species show that those of the putative hybrids are more or less intermediate, except perhaps for the floral bract of the Kassam specimen. Three features are worth noting in the putative hybrid specimens, these are the broadness of the labellum claw, the shape and angle of the lateral lobes and the lobules displayed below the callus. The plant and inflorescence characters of the Bulolo specimen tended to superficially resemble *S. paulinae* F. Muell., whilst that of the Kassam specimen resembled the other putative parent except for the length of the inflorescence which was twice or more longer and without dense hairs. In both cases, the floral bracts were not persistent, dying shortly before bud break, a feature of *S. portus-finschii* Krzl. and the third man made hybrid mentioned before.

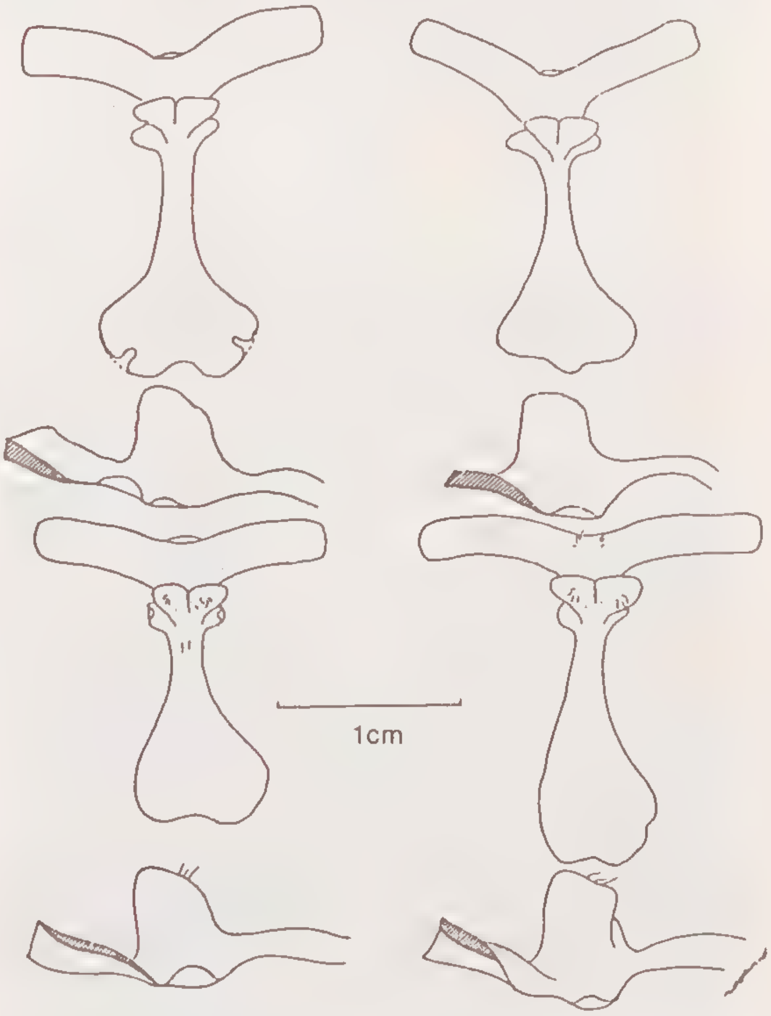


Fig. 6. Variation.
Spathoglottis sp.
Ex Lelete Plateau, New Ireland.
Labellum, callus and hairs.

The second putative hybrid is thought to have *S. papuana* Bail. var. *puberula* Schltr. and

S. portus-finschii Krzl. as its parents. The plant has the robustness of the first species but with larger flowers similar to the second species, but with smaller floral bracts. (Fig. 8). The characters worth noting are the shape and angle of the lateral lobes, the shape of the bilobed callus and the size, shape and hairiness of the floral bract. The inflorescence of the putative hybrid was twice as tall as that of *S. portus-finschii* Krzl., thicker and the floral bracts persisted but did not fold backwards as is the characteristic in the first species.

If these are truly hybrids, and there seems to be sufficient evidence to support this, then several questions are raised. The first, are any of the presently recognized species hybrids?, and if hybrids do exist, how common are they and how much influence will they have on the determination of diagnostic boundaries? Also of importance will be to know whether or not the hybrids are fertile and freely intercrossing. Generally F2 hybrids of *Spathoglottis* are difficult to make. However, if this is not the case in the New Guinea situation taxonomic research with the genus could be very interesting.

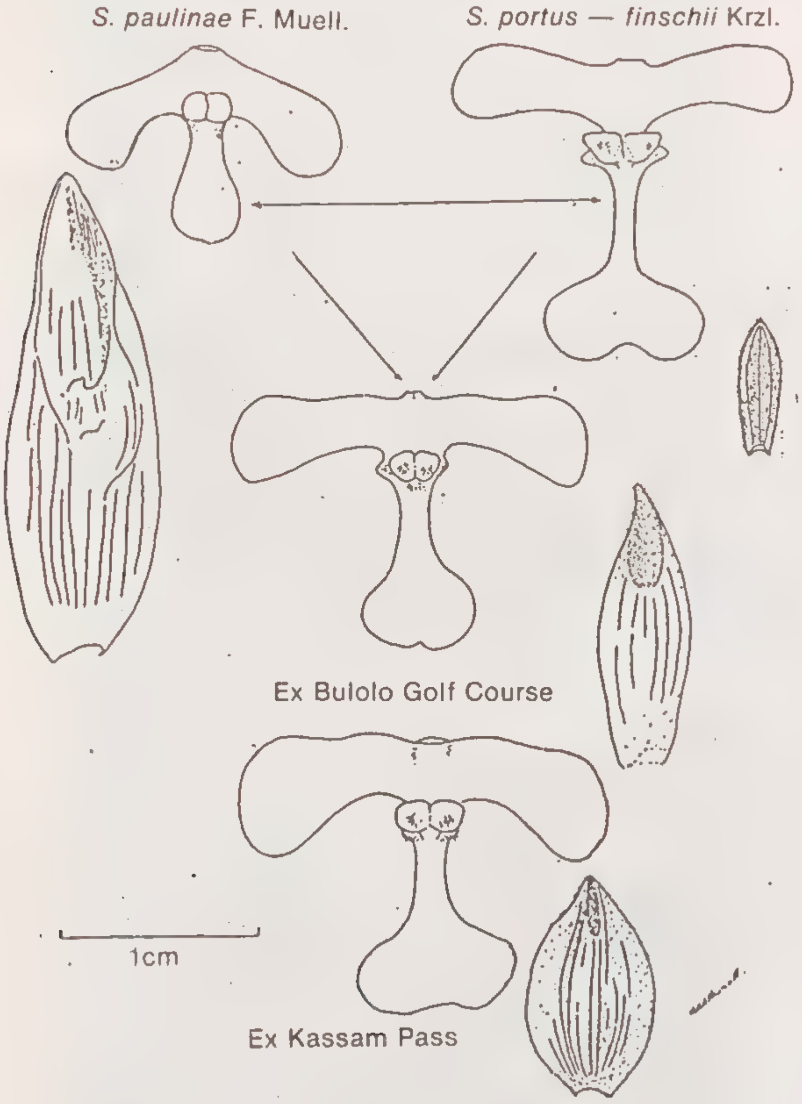


Fig. 7. Putative Natural Hybrid

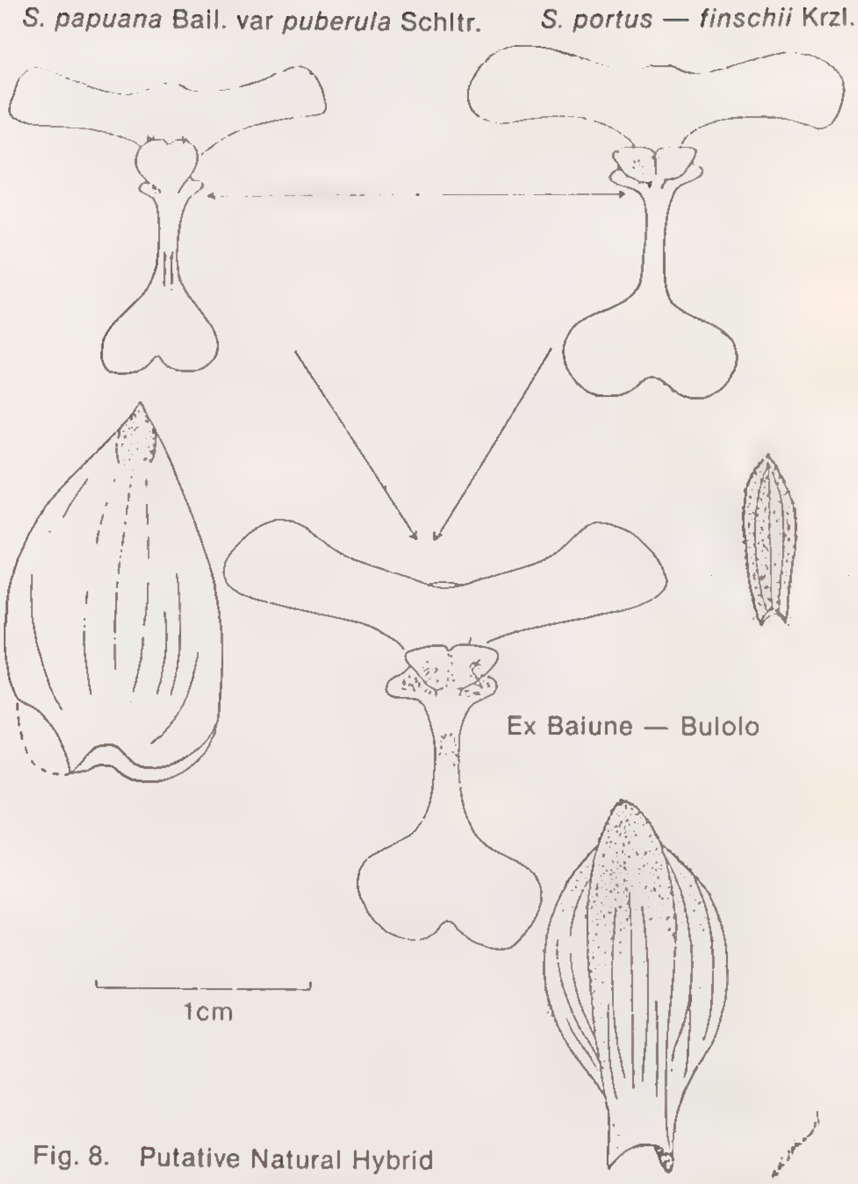

S. papuana Bail. var *puberula* Schltr.
S. portus — finschii Krzl.
Ex Baiune — Bulolo
1cm

Fig. 8. Putative Natural Hybrid

Appendix

Spathoglottis albida Krzl., in Notzbl. Bot. Gart. Berlin 11(1898), 107-108; Schltr., in Orch. D.N.-Guinea (1912) 401; Fig. Atl., t.CXXXXI, Nr. 530. New Britain (E.N.B.P.), grasslands near Ralum - Dahl n.650, March 1897; grasslands near Herbertshohe, alt. c.50m - Schlechter no. 13778, Nov. 1901; grasslands, North Daughter volcanoe - Dahl no.?, alt. 300m, Sept. 1896.

Spathoglottis alpina Rogers, in Proc. Roy. Soc. Sth. Aust. 54 (1930) 38-39. Papua, Nomi River, limestone precipice, alt. 7,000 feet, Nov. 23, 1923 -C.E. Lane-poole no. 529.

Spathoglottis altigena Schltr., in Orch. D.N.-Guinea (1912) 396; Fig. Atl. t.CXXXIX, Nr. 522; J.J. Smith, in Neue Orchideen Papuasiens (1934). Kaiser-Wilhelms-land, Dischore Range, Schlechter no. 19717, alt. 1,300m, June 1909; northeast New Guinea, Sarawaged Range, Ogeramnang, alt. c.1,800m - E. Mayr no. 875, 30th Mar. 1929.

Spathoglottis aurea J.J. Sm. (nec Lindl.) in Fl. Buit. VI. Orch. (1905) 218; Fig. Atl. CLXI; in Gibbs, Fl. Arfak Mts. (1917) 109; J.J. Smith in Nova Guinea XIV, Part III, (1929) 356. Dutch New Guinea: in northern part, Arfak Mts., Angi Lake (Anggi Meer), alt. 1,900m - K. Gjellerup no. 1044, April 1912.

Spathoglottis bulbosa Schltr., in Orch. D.N.-Guinea (1912) 400; Fig. Atl. t.CXXXX, no. 527. Kaiser-Wilhelms-land: in Forest of Gomadjidji, on the Waria, alt. 450m - Schlechter no 19354, May 1909.

Spathoglottis doctersii J.J. Sm., in Nova Guinea XVIII (1934) 18-19, Tab. IV, 6. Dutch New Guinea: Rouffaer River, alt. c. 175m - W.M. Docters van Leeuwen no. 10124, Aug. 1926.

Spathoglottis doctersii J.J. Sm. var. *emarginata* J.J. Sm., in Nova Guinea XVIII (1934) 19, Tab. IV, 6. Dutch New Guinea: Rouffaer River, alt. c. 250m -W.M. Docters van Leeuwen no. 10253, Sept. 1926.

Spathoglottis elobulata J.J. Sm., in Nova Guinea XIV, Part III (1929) 354-355, t.XLVI, 15. Dutch New Guinea: Temena River (Exp. R. Wichmann, 1903. Djibdja, live pl. cult. in Hort. Bog. sub n.37h.). 'Inflorescences were often branched. The species should be compared with *Spathoglottis papuana* Bail. Description from living specimens.'

Spathoglottis erectiflora Schltr., in Fedde Repertor. XVII (1921), page? no. 721. Kaiser-Wilhelms-land: boundary between German and British New Guinea, Waria district - A. Kempf.

Spathoglottis grandifolia Schltr., in Orch. D.N.-Guinea (1912) 398; Fig. Atl. t.CXXXX, no. 525. Also K. Schum. et Laut., Fl. Dtsch. Schutzg. Suds. (1901), 244. Kaiser-Wilhelms-land: steep open slopes near the Kaulo base, alt. 250m - R. Schlechter n. 16339, July 1907; steep shady rockfaces, banks of Maijen (River), alt. 100m - R. Schlechter no. 18050, July 1908; moist slopes of creek banks at foot of Finisterre Range, alt. 400m -R. Schlechter no. 19133, Jan. 1908. Note: previously identified by Kraenzlin as *S. plicata* krzl (nec Bl.) in K. Schum et Laut., Fl. Dtsch. Schutzg. Suds. (1901) 244.

Spathoglottis hollrungii Krzl., in K. Schum. et Hollr., Fl. Kaiser-Wilhelms-land (1889) 33; in Orch. D.N.-Guinea (1912) 394-395. (Hollrung no. 230?,3 sheets, same number, each named differently by Kraenzlin in Berlin Herb.).

Spathoglottis kenejiae Schltr., in Orch. D.N.-Guinea (1912) 395-396; Fig. Atl. t.CXXXIX no. 521. Kaiser-Wilhelms-land: on damp grassy depressions in the plains of the Kenejia River, alt. 150m - R. Schlechter no. 19290, Sept. 1908. Note: Kenejia R. possible the upper reaches of the Ramu River on the north eastern side of the Bismark Range.

Spathoglottis lane-poolei Rogers, in Trans Roy. Soc. of Sth. Aust. 49 (1925) 259-260. Papua, Owen Stanley Range: at Embi Lake, between Mt Oberee and Kargi, alt. 200 feet - C.E. Lane-poole no. 249. Note: Holotype type sighted, Queensland Herbarium, sheet no's 3,11997 - 3,11998 and Q.H.022534. The species appears to be identical to *S. papuana* Bail. A specimen also exists at the Adelaide Herbarium marked as the holotype and will have to be checked.

Spathoglottis lauterbachiana Krzl., in K. Schum. et Laut., Fl. Dtsch. Schutzg. Suds. (1901) 244; Schlechter in Orch. D.N.-Guinea (1912) 395, (= *S. portus-finschii* Krzl.). Kaiser-Wilhelms-land: Nuru River, alt. 160m - Lauterbach no. 2251.

Spathoglottis montana Van Royen, in The Alpine Flora Of New Guinea 2 (1980) 152 - 154; Fig. 62. Papua New Guinea (T.N.G.): Victor Emanual Mts, Mt Kefalabim - Van Royen 11436; Mt Hagen, E. side - holotype, Wheeler A.N.U.6382 (Canb.); Papua, Ibiwara - Kalkman'4923, grasslands, alt. 2700-3050m, July.

Spathoglottis microchilina Krzl., in Engl. Jarb. XVII (1893) 482 = *S. wrayi* Hook. f., in Fl. Br. Ind. V (1890) 813; Ic. Pl. t. 2086. - *S. aurea* J.J. Sm. (nec Lindl.), in Fl.
Buit. VI, Orch. (1905) 218, Fig. Atl. CLXI; in Gibbs, Fl. Arfak Mts (1917) 109, - *S. microchilina* Krzl. in Smith, Nova Guinea XIV (1929), part III, 356. Dutch New Guinea: northern part, Arfak Mts, Angi Lakes, alt. 1900m K. Gjellerup no. 1044, April 1912.

Spathoglottis obovata J.J. Sm., in Bull. Dep. Arg. Ind. Neerl. XXXIX (1910) 20; in Nova Guinea VIII, Part III, (1911) 529, t.LXXVIIC; in Neue Orchideen Papuasiens (1934). Dutch New Guinea: between Alkmaar and Hellwig Range - Von Romer no. 758, flowering Oct. 1909; Treub Range, alt. 2,200m -J.W. Van Nouhuys, Oct. 1904.

Spathoglottis oreophila Ridl., in Trans. Linn. Soc., 2nd series IX (1916) 203. Dutch New Guinea: Camp IX-XI, 5,500 - 8,300 feet.

Spathoglottis papuana Bail., in Qld. Agric. Journ. 3 (1898) 159. Papua: Porlock Bay, Northern Province (?), Near sea level, type material in Bris. Herb. -F.M. Bailey, Bris. no's 023250, 023249, 023248.

Spathoglottis papuana Bail. var. *puberiflora* Rogers et White.; in Trans. Roy. Soc. S. Aust. 44 (1920) 116-117. Papua: Mafulu, Northern Province (?), C.T. White no. 445, Bris. no. 3120. Note: Also marked on herbarium sheet as variety *hispidula*. This name does not appear to have been published.

Spathoglottis papuana Bail. var. *puberula* Schltr., in Orch. D.N.-Guinea (1912) 397-398, Fig. Atl. t.CXXXIX, no. 524. Kaiser-Wilhelms-land: banks of the Garup River, alt. c. 100m - R. Schlechter no. 20019, Sept. 1909; stream edges, slopes of the Torricelli Range, alt. c. 400m - R. Schlechter no. 20130, Sept. 1909; slopes of the lower Nuru River, alt. c. 100m - R. Schlechter no. 14299, Feb.-Mar. 1902.

Spathoglottis parviflora Krzl., in Eng. Bot. Jahrb. XVI (1892) 18; Schlechter, in Orch. D.N.-Guinea (1912) 401; Fig. Atl. t.CXXXXI no. 529; J.J. Smith in Neue Orchideen Papuasiens (1934). Kaiser-Wilhelms-land: Finisterre Ranges, alt. 1,600m - Hellwig no. 328, 15th Oct. 1888; R. Schlechter no. 18006, July 1908; no. 19159, Jan. 1909.
Northeast New Guinea: Sattleberg up to Junzaing, alt. c. 800 - 1,500m - E. Mayr no. 716, Jan 1929. Note: Smith believed *S. ovata* J.J. Sm. is synonymous with this species.

Spathoglottis patentibractea J.J. Sm., in Engl. Bot. Jahrb. LXVI (1934) 180. Dutch New Guinea: Waigeoe Island, Supintol, cliffs overhanging water - G. Stein no. 210, 8th June 1931; no. 262a, 12th June 1931. Note: Aff. *S. plicata* Bl. Description from incomplete herbarium material.

Spathoglottis paulinae F. Muell., in Fragm. Phyt. Aust. 6 (1867) 95; Bentham, in Fl. Aust. 6 (1873) 304; Fitzgerald, in Aust. Orch. 1 (1880) pt. 6; F.M. Bailey, Syn. Qd. Fl. (1883) & Qd. Fl. 5 (1902) 1542; Dockrill, in Orchadian 2 (1965) 2-5 & Aust. Indigen. Orchids 1 (1969) 246. Type: Queensland - Dallachy (holotype MEL, isotype K). *S. soutteriana* F.M. Bail., in Proc. R. Soc. Qd. 11 (1895) 15 & Qd. Fl. 5 (1902) 1543. Types: Queensland, Nugent (syntype BRI) & Cowley (syntype BRI); *S. rivularis* Schltr., in Feddes Rep. 1 (1912) 397. Type: Papua New Guinea between Waria and Gobi -R. Schlechter 19555 (holotype B); Cribb & Tang, in Kew Bull. 36 (4) (1982) 726, synon. nov. Note: This species is close to *S. altigena* Schltr. and may prove to be synonymous; the name *S. paulinae* predates Schlechter's species.

Spathoglottis plicata Bl., in Bijdr. (1825) 401, t.76; Lindley, Gen. & Spec. Orch., (1831) 199; J.J. Smith, Orch. Java, 6 (1905) 219; Nova Guinea VIII (1909) 25, part 1; Nova Guinea VIII (1911) 529, part III; Holttum in Malayan Orchid Rev., 2 (1) : 11 (1934); Yunker, Pl. Tonga, (1959) 90; Van Bodegom, in Enige Orchideeen van West Nieuw Guinea (1973) 34-39; Halle in Flora Nouv - Caledonie et Dep., 8 (1977) 208. Type: Java, Blume (holotype Bo). Dutch New Guinea: Noord River, Bivak Island - G.M. Versteeg no. 1031, flowering May 1907; south of Geluks Hill, banks of water course - G.M. Versteeg no's 1461 and 1491. North New Guinea: near Tobadi - Wichmann exped. 1903, Atasrip no 122, Djibdja no. 142h, living plant; Geelvink Bay & MacCluer Gulf - W. Den Berger 1906, living plant. Dutch New Guinea: Noord River, gravel beds of plains - Von Romer, no's 356 and 301, Oct. 1909; foot hills of Hellwig Range, alt. c. 750m - Von Romer No. 957, Nov. 1909.

Spathoglottis plicata Krzl., in K. Schum et Holl ., Fl. Kaiser-Wilhelms-land (1889 33, (nec Bl.); Schlechter, in Orch. D.N.-Guinea (1912) 394. (= *S. portus-finschii* Krzl.).

Spathoglottis portus-finschii Krzl., in K. Schum. et Hollr., Flor. Kaiser-Wilhelms-land (1889) 32; Schlechter, in Orch. D.N.-Guinea (1912) 394-395; Fig. Atl. t.CXXXVIII, no. 520. (= *S. hollrungii* Krzl., *S. plicata* Krzl. (nec Bl.), *S. pubescens* Krzl., *S. lauterbachiana* Krzl.). Kaiser-Wilhelms-land: On rock-faces, Nuru River, alt. c. 160m - C. Lauterbach no. 2251, July 1896; location ?, alt. c. 100m -R. Schlechter no. 14302, Feb. 1902; grassy hills near Minien River (Madang Province), alt. c. 100m -R. Schlechter no. 16216, June 1907; grassy hills at foot of Bismark Range, alt. c. 200m - R. Schlechter no. 18647, Nov. 1908; Massa, near Boja River (Huon Peninsular) close to Finschhafen - Hollrung no. 230, July 1886; in grass near Kelana (facing limboi Is.) - Hellwig no. 50, July 1888.

Spathoglottis pubescens Krzl., in K. Schum. et Laut., Fl. Dtsch. Schutzg. Suds. (1901) 244, (nec Lindl.); Schlechter, in Orch. D.N.-Guinea (191) 461 (= *S. portus-finschii* Krzl.). Kaiser-Wilhelms-land: Nuru River - Lauterbach, 5th. July 1896.

Spathoglottis pulchra Schltr., in K. Schum. et Laut., Nachtr. (1905) 147; in Orch. D.N.-Guinea (1912) 401; Fig. Atl. t. CXXXX, no. 528. New Britain: moist sunny slopes, upper Karo River, Beining (Baining) Range, alt. 400m - R. Schlechter, no. 13700, Oct. 901.

Spathoglottis rivularis Schltr., in Orch. D.N.-Guinea (1912) 397; Fig. Atl. t.CXXXIX, no. 523; Cribb et Tang, in Kew Bull. 36 (4) (1982) 726-729 (= *S. paulinae* F. Muell.). Kaiser-Wilhelms-land: Rock clefts on the Waria River near Gobi, alt. c. 300m -R. Schlechter no. 19555, May 1909.

Spathoglottis stenophylla Ridl., in J. B t. 24 (1886) 354; Schlechter, in Orch. D.N.-Guinea (1912) 394; Rogers, in Proc. Roy. Soc. Sth. Aust. 54 (1930) 38. British New Guinea: Sogeri?.

Spathoglottis wariana Schltr., in Orch. D.N.-Guinea (1912) 399; Fig. Atl. t.CXXXX, no. 526.

Bibliography

Addison, G.H. (1961) 'Malayan Orchid Hybrids', First Supplement, Gov. Printing Office, Singapore.

Ames, O. (1908) *Orchidaceae: Illustrations and Studies of The Family Orchidaceae. Fascicle 11.* The Ames Botanical Laboratory North Easton Mass. Houghton, Mifflin and Co. Riverside Press Cambridge.

Ames, O. (1915) *Orchidaceae. Illustrations and Studies of The Family Orchidaceae. The Genera and Species of Philippines Orchids. Fascicle V.* The Ames Botanical Laboratory, North Easton, Mass. The Merrymount Press, Boston.

Backer, C.A. (1952) *Beknope Flora von Java - Orchidaceae.* Vol. 1 - 3.

Bechtel, H., Cribb, P. and Launert, E. (1981) *The Manual Of Cultivated Orchid Species.* Blandford Press. Poole, Dorset.

Bentham, G. and Hooker, J.D. (1883) Orchideae. In *Genera Plantarum,* vol. 3. L. Reeve & Co. London.

Blume, C.L. (1825) *Bijdragen Tot de Flora Van Nederlandsch Indie.* Ter Lands Drukkerij, Batavia.

Cribb, P.J. and Tang, C.Z. (1982) *Spathoglottis* (Orchidaceae) in Australia and the Pacific Islands. *Kew Bulletin.* Vol. 36 (4) : 721-729.

Dakkus, P.M.W. (1935) *Orchideen Welke in Nedlandsch Indie Gekweekt Kunnen Worden.* 3 rd. Edition. Nix & Co., Bandoeng.

Dockrill, A. (1969) *Australian Indigenous Orchids* Vol. 1. The Society for Growing Australian Plants, Sydney.

Fisher, (1965) *The Alpine Ranunculi of New Zealand,* New Zealand D.S.I.R. Bulletin 165. R.E. Owen, Government Printer. Wellington, New Zealand.

Halle, N. (1977) Orchidacees. In *Flore de la Nouvelle - Caledonie et Dependences,* Vol. 8. Museum National d'Histoire Naturelle, Paris.

Henderson, M.R. & Addison, G. (1965) *Malayan Orchid Hybrids.* Singapore Government Printing Office.

Holttum, R.E. (1954) *Orchids of Malaya,* in *A Revised Flora of Malaya* 3rd. edition, 1964. Government Printing Office, Singapore.

Kooders, S.H. (1924) *Excursion Flora von Java Umfassend die Blutenpflanzen, Atlas.*

Latif S.M. (1953) 'Bunga Anggerik', N.V. Penerbitan, W. van Hoeve, Bandung's Gravenhage.

Lindley, J. (1931) *Genera and Species of Orchidaceous Plants.* Ridgways, London.

Lindley, J. (1938) Paxtonia rosea. In *Edward's Botanical Register.* Ridgway, London.

Mueller, C. (1861) Spathoglottis Bl.. In *Walpers. Annales Botanices Systematicae. Tomus VI..*

Sarcochilus falcatus

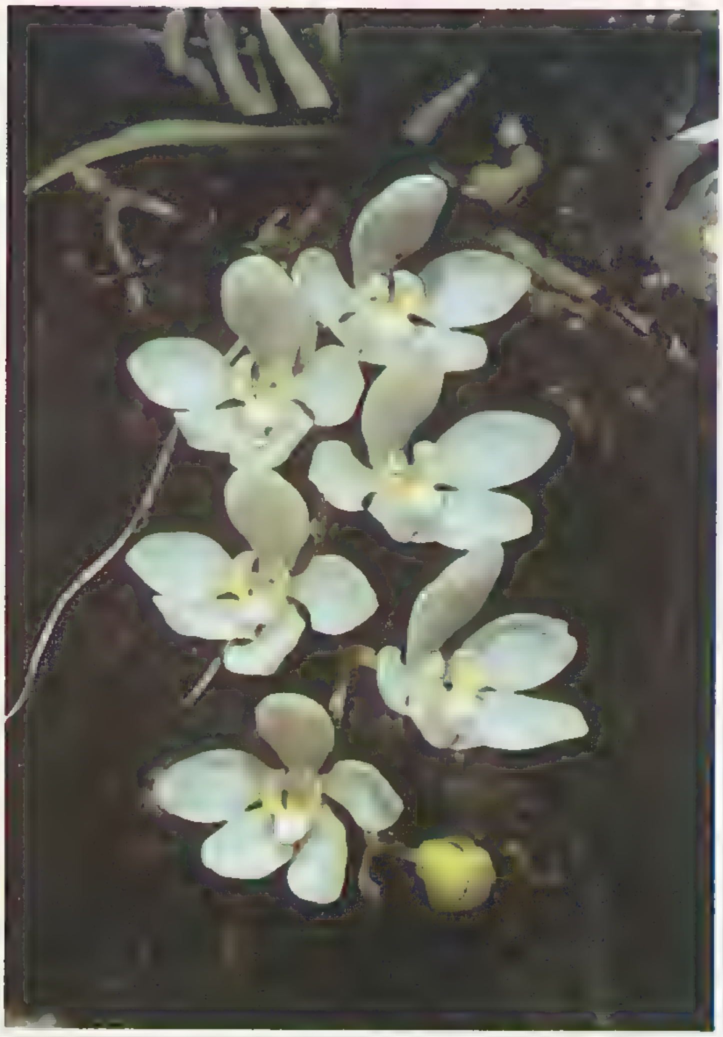


Fig. 1. This is the 'white form' of *Sarcochilus falcatus* discussed in Gerry Walsh's article.

Photograph by C. Walsh.

Spathoglottis

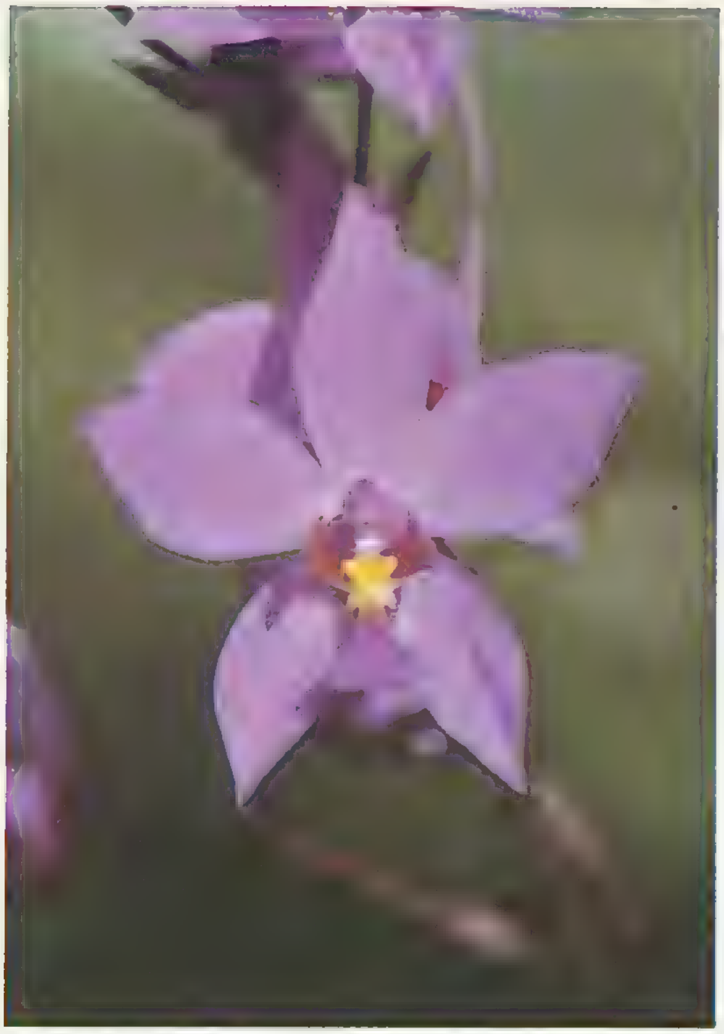


Fig. 2. The putative natural hybrid, *Spathoglottis portusfinchii* x *paulinae,* showing the broad claw of the labellum's mid lobe and the presence of lobules at the base of the callus Ex Bulolo golf course.

Photograph by N. Howcroft.

Spathoglottis

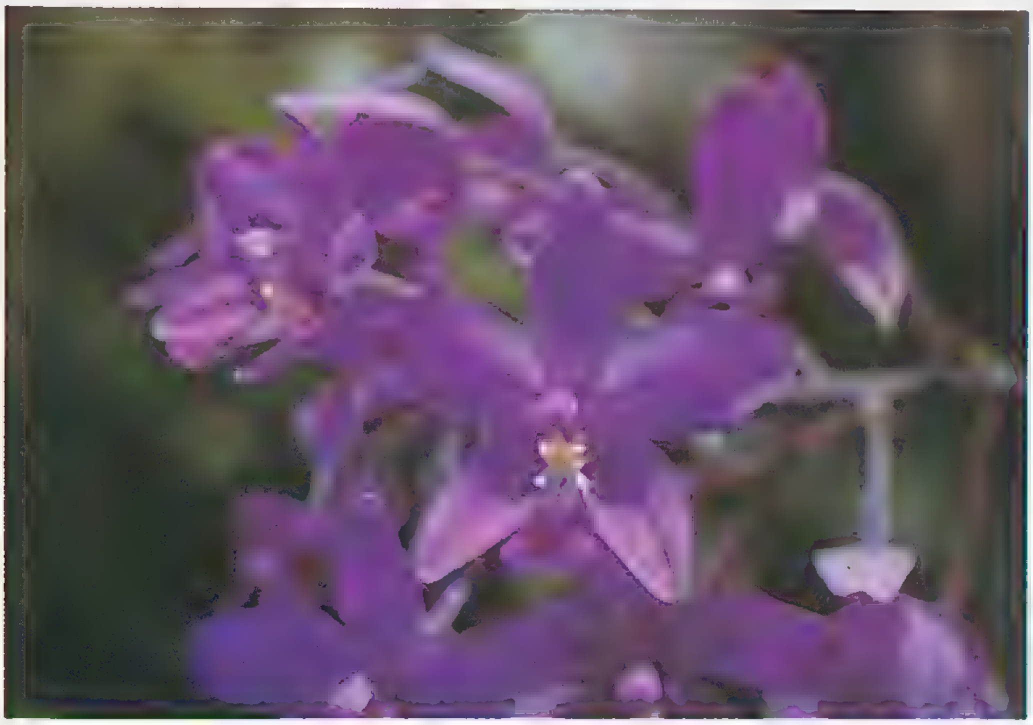


Fig. 3. *Spathoglottis portus-finschii.* Note the absence of conspicuous floral bracts and presence of lobules at the base of the callus. Snake River. Bulolo.

Photograph by N. Howcroft.

Thelymitra Hybrid

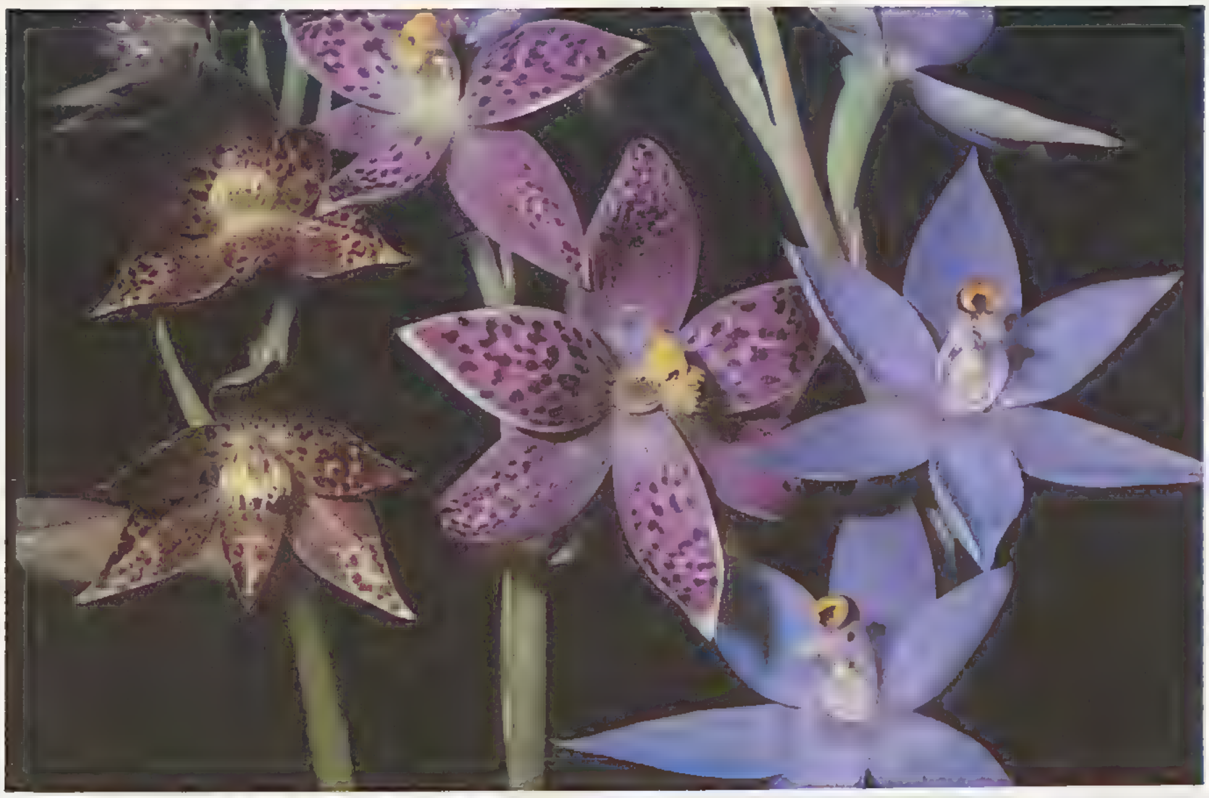


Fig. 4. The putative natural hybrid, *Thelymitra fuscolutra* x *T. nuda* flanked by the respective parents Albany, Western Australia.

Photograph by R. L. Herbele.

Cymbidium canaliculatum

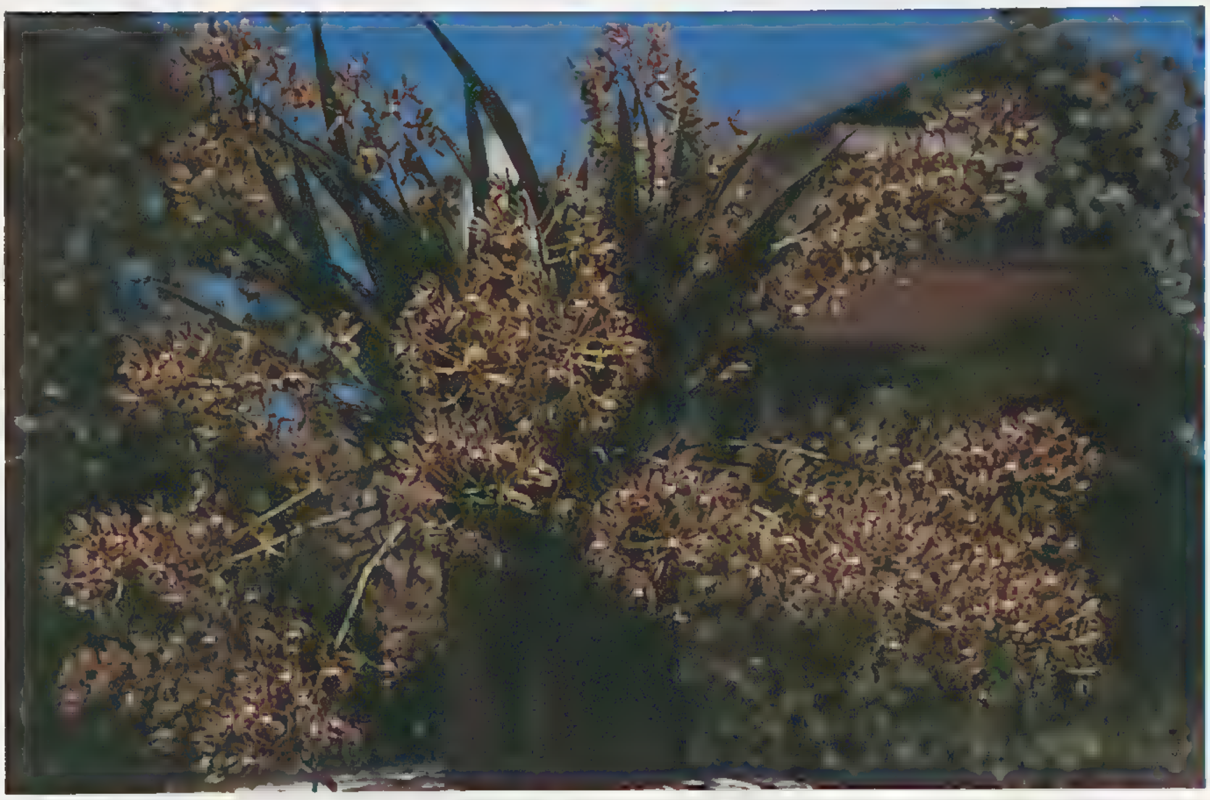


Fig. 5. A magnificent specimen of *Cymbidium canaliculatum* grown by Eric Webeck.

Photograph by E. Webeck.

Ridley, H.N. (1916) *Transaction of the Linnaean Society*. Series 2, Vol. IX.

Rogers, R.S. and White, C.T. (1920) A Contribution to the Orchidaceous Flora Of Papua (British New Guinea). In *Transactions and Proceedings of The Royal Society of South Australia,* Vol. XLIV.

Rogers, R.S. (1925) Contributins to the Orchidology of Papua and New Guinea. In *Transactions and Proceedings of the Royal Society of South Australia,* vol. XLIX.

Rogers, R.S. (1930) Contributions to the Orchidology of Papua and Australia. In *Transactions and Proceedings of the Royal Society of South Australia,* Vol. LIV.

Rumphius, G.E. (1750) *Herbarium Amboinensis.*

Schlechter, R. (1911) *Zur Kenntnis der Orchidaceen von Celebes* Fedde Repert. Vol. X.

Schlechter, R. (1914-28) *Die Orchidaceen von Deutsch-Neu-Guinea,* Fedde Repert., Beihefte 1 & 21.

Schlechter, R. (1919-21) *Additamenta ad Orchideologiam Papuanum I - IV,* Fedde Repert. Vols XVI - XVII.

Schlechter, R. (1922-23) *Neue Orchidaceen Papuasiens,* Engl. Bot. Jahrb. Vol. 58.

Schlechter, R. (1925) *Die Orchidaceen der Insel Celebes,* Fedde Repert. Vol. XLV.

Schlechter, R. (1927) *Die Orchideen.* Paul Pary, Berlin.

Schumann, K. and Hollrung, M. (1889) *Die Flora von Kaiser Wilhelms Land.* Asher & Col., Berlin.

Schumann, K. and Lauterbach, K. (1901) *Die Flora der Deutschen Schutzgebiete in der Sudsee und Natrage.* Reprint 1976, J. Cramer.

Schumann, K. and Lauterbach, K. (1905) *Natrage zur Flora der Deutschen Schutzgebiete in der Sudsee.*

Smith, J.J. (1905) *Die Orchideen von Ambon,* Dept. Agriculture, Batavia.

Smith, J.J. (1905) *Die Orchideen von Java,* Flora von Buitenzorg Vol. VI, E.J. Brill, Leiden.

Smith, J.J. (1909) *Nova Guinea* Vol. VIII, Botanique, part 1. E.J. Brill, Leiden.

Smith, J.J. (1910) *Bulletin du Department De L'Agriculture aux Indes Neerlandaises,* no. XXXIX.

Smith, J.J. (1911) *Nova Guinea,* vol. VIII, Botanique, part III.

Smith, J.J. (1913) *Nova Guinea,* Vol. XII, Botanique, part I.

Smith, J.J. (1915) *Nova Guinea,* Vol. XII, Botanique, part III.

Smith, J.J. (1916) *Nova Guinea,* Vol. XII, Botanique, part IV.

Smith, J.J. (1917) Orchidaceae in *Gibb's Phytogeography and Flora of The Arfak Mountains,* London?

Smith, J.J. (1928) *Orchidaceae Serananses,* Bull. Jard. Bot. Buit. 3e Ser., IX.

Smith, J.J. (1929). *Nova Guinea,* Vol. XIV, Botanique, part III.

Smith, J.J. (1934) *Artificial Key to the Orchid Genera of the Netherlands Indies, together with those of New Guinea, the Malay Peninsula and the Philippines,* Blumea Vol. I, no. I.

Smith, J.J. (1934) Neue Orchideen Papuasiens. In Engler, A., *Botanische Jahrbucher.* LXVI.

Smith, J.J. (1935) *Nova Guinea* Vol. XVIII, part I, E.J. Brill, Leiden.

Teoh Eng Soom (1980) *Asian Orchids.* A.H. & A.W. Reed, Sydney.

Van Bodegom, J. (1973) *Enige Orchideeen van West Nieuw Guinea.* Technical High School Twente.

Van Royen, P. (1980) Orchids of High Mountains in New Guinea. In *Mountain Flora of New Guinea,* Vol. 2. J. Cramer.

Bulolo
27 February, 1986 **Papua New Guinea**

Cymbidium canaliculatum

Cultivation by the Webeck method

by M. Harrison

During the middle of 1985 I had the opportunity to visit the home of Eric Webeck, the purpose being to see his collection of *Cymbidium canaliculatum.* Eric has something of a reputation as a grower of this orchid, and after having seen a couple of his plants at monthly meetings of ANOS Sydney Group, I was anxious to have a look at the entire collection.

Eric lives in Pymble, one of Sydney's northern suburbs, approximately 20 kilometres from the city centre. One of the long-established areas of Sydney suburbia, this region features a comfortable, relatively mild climate, with a fairly even year-round rainfall, averaging 1387 mm per annum. The altitude (165 metres at St. Canisius College), prevailing weather and good soils have always attracted the well-to-do and many beautiful old homes and gardens bear testament to the gracious life-styles of days gone by.

An old tennis court forms what is now Eric's orchid house. At each end of this area (north and south) there is a glasshouse measuring 12 metres by 5 metres, and the large area between these glasshouses has overhead shading but is quite open on the sides. The shading consists of strips of aluminium approximately 2.5cm wide which run north/south for the entire length of the shadehouse. These strips are threaded through chicken wire to keep them in place and are arranged to give a shade factor of 50%. Here Eric grows his collection of *Dendrobium* *kingianum, D. X delicatum* and *D.* Bardo Rose. I do not know how he gets away with it, but all these plants are grown on steel mesh panels, supported just inches above the ground by house bricks. Many of the pots are overgrown with liverworts and ferns, especially *Selaginella* sp. (Club Moss) due, no doubt, to the heavy watering and feeding programme Eric favours. To look at these conditions one would think that if the constant moisture did not rot the plants, then the snails and slugs would run amok, but this is clearly not the case; these orchids are performing superbly, as well as any collection of these types I know.

In what must be a unique undertaking, every *D. kingianum* in the place, and there are hundreds, is a product of line-breeding, a programme Eric commenced many years ago with a couple of plants collected from the Comboyne Plateau. At no time has any other *D. kingianum* been introduced into this line, so that every plant is a direct and exclusive decendant of the original clones. Eric's famous *D. kingianum* 'Bungan Castle', which was awarded an A.M. and a Cultural Certificate by OSNSW in 1979, is one of the progeny of this breeding programme. More recently, *D. kingianum* 'Ruperta' has been attracting the attention of judges at ANOS and OSNSW Shows. Incidentally, *D. kingianum* 'Bungan Castle' is now a huge specimen plant in an 18″ plastic tub. A very floriferous and vigorous clone, it is quite spectacular when seen in full bloom.

Specimen plants are Eric's forte, and no-one who has visited the annual Mona Vale Show in recent years could forget his magnificent *D. X delicatum,* also known by the clonal name of 'Bungan Castle'. It appears in perfect condition year after year, and, year after year, Eric collects the W.H. Murdoch Award and Medal for Champion Specimen Hybrid Orchid.

Eric's plants of *Cymbidium canaliculatum* are housed in the glasshouse on the northern end of the shadehouse/tennis court, and, except for a few trays of hybrid Cymbidium seedlings, are the only plants in this rather large structure. This glasshouse is very open in design, with a skillion roof inclined to the north, and walls that extend down to just below bench level, leaving the bottom half metre or so completely open. The two doorways are also permanently open and the resulting free air flow around and under the benches is responsible, I believe, for a large measure of Eric's success with this orchid.

The pots of *C. canaliculatum* are situated on the bench running along the north wall, so that during summer they receive some shade from the white-washed roof, and during the cooler months, when the sun is at a lower angle in the northern sky, the clear glass on the wall allows full sun through onto the plants. Eric uses terracotta and cement pots for larger plants and plastic pots for smaller plants. He also uses some 5 litre steel cans for intermediate sized plants. His potting mix consists basically of medium grade pine bark but may also include some coke ash and a little leaf compost out of the garden.

In a significant departure from accepted cultural practices for *C. canaliculatum,* Eric waters and feeds his plants just about every day, except during the colder months, when this is cut down to just once or twice a week. He uses a compression hand pump sprayer with a ¼ strength solution of Thrive plant food and applies this to the surface of the potting mix but not to the plants' foliage. This almost daily watering/feeding programme keeps the mix constantly damp and also provides the roots with a permanent supply of food. From time to time the plants are given a good soaking with plain water from the hose to flush the potting mix.

At the beginning of each growing season, Eric top dresses the pots with fowl manure and also generally adds a pinch of iron chelates and epsom salts. Of particular interest is the importance Eric attaches to the pH of the potting mix. He assesses this by testing the last free water dripping from the bottom of a pot after watering, with pH indicator paper. He aims to maintain a reading on the alkaline side of neutral, and to this end he adds to each pot a tablespoon or two of dolomite twice a year, or as necessary. This, Eric says, slows the breakdown of the potting mix and it is this breakdown and subsequent "souring" (becoming progressively more acid) which causes this species in particular to regress in cultivation.

In summary, there appear to be several important factors accounting for Eric's success with *C. canaliculatum.* Free air circulation, coupled with good light, is essential. The fact that the plants are protected from rain is significant, for even though the roots are kept damp, the head of the plant stays relatively dry. This is probably of particular benefit during the winter in Sydney, when periods of cold, rainy weather may persist for days. And finally, the regular feeding and maintenance of an alkaline potting mix are, according to Eric, of fundamental importance.

Lot 2, Howes Rd.
East Kurrajong via
Wilberforce 2756.

27 February, 1986

BOOK REVIEW

Review by S.D. Hopper

"Growing Orchids Book Four, The Australasian Families" — J.N. Rentoul

We live in an exciting time in the history of Australian orchidology. Clubs devoted to the cultivation and conservation of orchids abound in cities and in country towns across the continent. No other group of native plants attracts such interest in people from such a broad spectrum of the community, young and old, urban and rural. This enthusiasm has spread to professional botanists, and major discoveries are an almost daily experience — new species are found, old ones rediscovered, new techniques successfully applied in cultivation, new hybrids created, new insights gained into pollinators and their behaviour.

A number of books on Australian native orchids have appeared on the market recently as a consequence of the growing popularity of these plants. J.N. Rentoul is a well known author on the subject of growing orchids, with a lifetime of practical experience behind him. The book under review is the fourth and last in a series. It details with the Australasian members of the orchid family, both epiphytes and terrestrials. The author intends the book to be "... a guide to those people who wish to cultivate, propagate and possibly re-establish these plants in suitable environments to preserve them." Prophetically, the author makes it clear that his work is not intended for the serious student or professional: "The books **Growing Orchids** were written for orchid growers, not taxonomists. It is also possible that they may not please botanists as such."

Reading the work from cover to cover leaves no doubt that the author's introductory remarks are entirely accurate. I would suggest that in addition to taxonomists and botanists, the book will disappoint most readers looking for an up to date review of knowledge on Australasian native orchids. The text is marred by many errors of fact, an idiosyncratic writing style that occasionally lapses into confusion, and the author's colourful speculations on the evolution of Australasian orchids. The latter make scant mention of the major advances made in evolutionary science since Darwin, nor of developments in modern Australian plant evolutionary studies that promise a new understanding of the origin of our orchids.

A few examples should suffice to illustrate these points. Factual errors range from incorrectly identified plants in colour plates (a *Pterostylis* is labelled as *Chiloglottis gunnii* on p. 57; another *Pterostylis* as *Lyperanthus nigricans* and the latter as *Gastrodia sesamoides* on p. 67, *Prasophyllum fimbria* as *P. elatum* on p. 25); using the word "family" for "genus" (title, p. 8); to stating that 90 cm equals 3ft 6in (p. 19); that *Paracaleana* has only one species (p. 62 — it has two); that *Lyperanthus nigricans* and *L. serratus* grow in New Zealand (p. 67 — neither do); that *Dendrobium kingianum* is a saprophyte (p. 92 — it is a green-leaved lithophyte); that the Tertiary epoch began two million years ago (p. 157 — it was 60 - m.y. ago) etc.

As to writing style, the author is inconsistent in his treatment of scientific names, which are sometimes italicized, sometimes not, with authors cited in brackets with and without the date of publication. He has an idiosyncratic use of certain words, making it hard for the reader to grasp the gist. Some sentences are beyond my comprehension, e.g. "The separation can be fabricated about the terete group of dendrobium, which gives a legitimate viewpoint regarding the presence of *D. striolatum* in Tasmania" (p. 46), and "It is also possible that they are crass in having sex-linked pollination characteristics and so do not form populations" (p. 14). He occasionally lapses into telegraphic phrases, notably his repetitious use of "colour variable" for variable in colour (e.g. p.p. 21, 27, 80, 96). His spelling is Americanized for the words "color", "odor" and "favor", but otherwise Oxford English. And lastly, the text is poorly structured e.g. the aim is not stated in the Introduction but buried on page 6 well into a chapter on terrestrial orchids. No literature is cited in a bibliography, nor is any indication given that the author has attempted to come to grips with it and present a review of use to growers. The title is misleading in that little of the text has to do with growing orchids. On page 28 the title "Other Terrestrial Genera" is misplaced and captions to photos on page 67 are in disarray.

These criticisms aside, there is no doubt that the author is enthusiastic about orchids. He knows his epiphytes and how to grow them. He is for conservation (though not, it appears, in the case of efforts made by government) and against digging up plants in the wild. His photographs are on the whole excellent, some (by W.H. Nicholls) are of historical interest, and others are not to be found together elsewhere (e.g. the selection of epiphytic hybrids).

Continued next page

A Putative Hybrid from Albany, Western Australia

Thelymitra fuscolutea var. *fuscolutea* R. Br x *T. nuda* R. Br.

by R.L. Heberle

Putative *Thelymitra* hybrids in the Albany region have proved to be a most infrequent occurrence in our experience.

A Saturday afternoon drive in mid November, 1985, proved to be a most exciting experience. We had stopped to admire a magnificent stand of *T. nuda* on a good road verge. On closer inspection we were surprised and elated to see flowering in amongst them, two quite conspicuous, pink speckled and maroon blotched *Thelymitras* — a first recording in our experience. Closer examination suggested that this exciting find was a hybrid between *T. fuscolutea* and *T. nuda*. More compelling evidence was the presence of *T. fuscolutea* dotted in amongst the *T. nuda* and no other *Thelymitra* species to be found in the vicinity. (See centre pages.)

The location was open savannah woodlands with *Eu. redunca* var. *elata* "Wandoo" dominant and a few sparse shrubs and sedges growing on the side of a hill sloping down to the road with sandy gravel soil amongst low granite outcrops. The site appeared to have been disturbed by road making many years before and this could have accounted for the paucity of vegetation.

Subsequent checks of records and literature and discussion with the orchidologists failed to find a previous recording. Apart from this, an interesting observation is that there is positive evidence of a self pollinating species hybridising with a non self-pollinating species. The find is also important as it is likely to throw a light in the somewhat controversial status of *T. macmillanii*, "species of hybrid?".

In the N.O.S.S.A. Journal, issues June, July, September and October, Bates, Marwick, Heberle and Brown all contributed papers on the subject of *T. macmillanii* against *T. x macmillanii*. I am on record as stating that I could not see the yellow of *T. antennifera* and the blue of *T. nuda* combining to produce the pink to orange and blood red of *T. macmillanii* in Western Australia. In the light of the current find, where base yellow spotted and blotched with brown of *T. fuscolutea*, and the blue of *T. nuda* have produced a pink speckled and maroon blotched hybrid, I have had second thoughts.

In offering the preceding as a basis for discussion, it is apparent that there is a pressing need for all we orchidologists to try very hard to keep an open mind. These orchids that we are trying to learn something about are much too "clever" to be underestimated.

Description

Stem — 65cm 3 evenly spaced bracts (below raceme) pale yellow.

Leaf — 120 x 25mm oblong lanceolate, slightly veed, apex pointed, pale green.

Raceme — 160mm spread — 13 flowers and buds (at collecting date) after 21 days 3 rest open.

Segments — 25 x 7mm except labellum 25 x 5mm for basal flowers reducing upwards, pink speckled maroon blotched on yellow base.

Column — 10 x 4mm erect, dilated and fringed lateral lobes, midlobe yellow, covered with shortpapillae, hairy tufts fine and sparse pale cream.

Ovaries — 20 x 4mm bracts just covering stems.

Fragrance — Sweet and faint as with *T. fuscolutea*.

Pollination — Not known. Not self pollinating. Measurements approximate.

78 Campbell Road,
Albany 6330 W.A.

21 December, 1985

BOOK REVIEW

Continued

I cannot, however, in clear conscience, be as forgiving nor as uncritical as the anonymous reviewer in a recent issue of the **Australian Orchid Review** in "strongly recommending" the book for purchase. It is too much a personal view of the subject to be of use to the reader interested in an authoritative and balanced review of the now burgeoning literature on native Australasian orchids. It is more a collector's item than a book of value to a general readership.

S.D. Hopper

Lothian Publishing Co. 1985, 190 pages, 227 colour plates. Recommended retail price — paperback $16.95, hardcover $22.50.

Sarcochilus falcatus

by Gerry Walsh

The woman who promised to love, honour and have unlimited patience at all times, does not understand me. She is not of my flock. She thinks *Oberonia* is an Italian opera. One day she will seek to avenge the hours of loneliness she pretends to endure. She would most likely hold a shotgun to my head and order me to rid my bushhouse of all the Italian operas and other native orchids therein. But the woman who promised to love, honour and keep her finger off the trigger has her good points. I just know that she would soften and allow me to keep at least one species — besides, she hates to see me grovelling at her feet. That species would be *Sarcochilus falcatus* ... all other species of native orchids would come second to the very beautiful and spell-binding 'Orange Blossom Orchid'.

The *Sarcanthinae* branch of the orchid "tree" has always attracted my attention more than any of the others and I can say with conviction that there is not a member of the *Sarcanthinae* that does not appeal to me. The genus *Sarcochilus* is unquestionably a major division of that branch and, in my unbiased opinion, the most beautiful. The *Sarcochilus* species native to Australia possess a wide range of distinguishing characteristics but when all the points are tallied up, my highest score would go to *S. falcatus.*

Some people will be surprised that I place it above its more revered relations such as *S. fitzgeraldii*, *S. ceciliae* and *S. hartmannii.* I confess that I have trouble keeping my eyes off a well grown plant of *S. hartmannii* "Blue Knob", but all the really good forms of *S. hartmannii* are similar, while the poorer forms are also similar to each other. The southern form found on the Carrai Plateau and in the wilder regions of the Hastings Valley is not a patch on the northern type form. While *S. fitzgeraldii* certainly does not become boring with its infinite variations in shape and colour, I can only recall seeing one outstanding clone on a bench. I have never heard of a 'named' clone based on quality as opposed to colour. Its attraction for me lies in the massed effect and not in the individual appearance of a single flower. *S. ceciliae* also looks its best in a massed display, especially if it happens to be a large saucer of mature plants with 20cm racemes popping up everywhere. And how unfortunate it is that none of these three species exhibits more than just a very faint hint of perfume, even during the hottest part of the day. In the case of *S. fitzgeraldii,* I have never been able to detect any fragrance at all. Presumeably there must be at some stage during blooming — has anyone noticed it? *S. falcatus* is different. There is a broad spectrum of shapes, colours and sizes over which it is found. And it is difficult to think of another species with such a powerful perfume as the "Orange Blossom Orchid", and in three completely separate fragrances.

S. falcatus has the widest distribution of all the *Sarcochilus* species of Australia. It occurs sparsely in north eastern Victoria and south eastern N.S.W., but becomes common from the Shoalhaven River (170kms south of Sydney) north to the bottom of Cape York Peninsula in Northern Queensland. It prefers to grow in rainforests and brush forests. It is particularly prevalent when such trees grow in volcanic soils. In the Hawkesbury sandstone country west of Sydney, it is virtually absent.

However, on the volcanic outcrops within the sandstone country, *S. falcatus* is quite common. It is easily observed at such places as Mt Wilson and Mt Tomah, where it shows a preference for Coachwood trees. *S. falcatus* can be found in damp areas, such as along watercourses, all the way up to the crests of razorback ridges miles away from surface moisture. It invariably selects a position with subdued levels of light. But just to throw a spanner into the works, in one area of the Barrington Tops in central N.S.W. it is extremely abundant on the River Oak (*Casuarina cunninghamiana*) where it receives virtually no shade at all. Rare plants can be seen growing on rocks within these habitats and I have seen it do so in the Numinbah Valley in southern Queensland, and just recently, several plants growing happily the same way 25kms south of Dungog, N.S.W. Whatever the habitat may be, *S. falcatus* is constant when selecting its position on a host tree. It is the only epiphytic member of its genus in Australia that does not germinate and grow on the outer twigs of a tree. I have never seen a plant on a branch of less than 2.5cms (1 inch) thickness. In fact, it shows a distinct preference for the main trunk and major limbs of a host. In certain forests of Antarctic Beech (*Nothofagus moorei*) it is common on the main trunk of these giants which often exceed 1m in thickness at 20m above the ground.

Having said this, it would not surprise me to learn that some readers have possibly seen the odd plant on small, outer twigs but this would not be the normal habit of *S. falcatus.* Rather it would be another example of the tremendous versatility of the species.

S. falcatus is flexible in its altitude requirements. It is found from sea level to about 1200 metres (4000ft) elevation. Whilst it is not common at sea level, I am reliably informed that grows just behind sand hills near Ballina, N.S.W., and that is common on *Casuarina glauca* growing on a small island in a tidal estuary 200kms south of Sydney. It may also occur in some sea-side rainforests and brushes on the N.S.W. north coast, where such habitat has been spared from development. I have not seen the species growing further south than Moruya N.S.W. (300kms south of Sydney) and it could be that plants in Victoria occur at sea level. Hopefully a reader may shed some light on this question. At the other extreme, *S. falcatus* is common at 1200 metres (4000ft) in many parts of the Barrington Tops and at a few spots inland from Port Macquarie. It is highly likely that it occurs at even higher elevations in the New England National Park region.

An average plant of *S. falcatus* would have between four and six leaves of between 6 and 10cms long. As the specific epiphet suggests, they are nearly always curved or sickle shaped. Much larger plants can be found and in the last week of September 1984, I was amazed to find a single plant up in 'The Tops' (Barrington) that measured the magic 'one foot' across the span. And it wasn't stretched between two trucks either! An old man falcatus with 13 leaves. This is the only plant I have ever seen that reached this dimension.

A wonderful sight to see is a large clump or 'keiki' of *S. falcatus* in full bloom. Keikis can attain tremendous dimensions and in the Dingo Tops of N.S.W. there is a 20cm diameter tree trunk that is completely encircled with a single keiki having around 40 flowering leads. The flowers are small but what a wonderful show it put on when discovered in October 1982. The same keiki also contains a sizeable clump of *Dendrobium pugioniforme* and a small plant of *D teretifolium* var. *fairfaxii.* Keikis mainly develop when juvenile flower racemes just emerging from the leaf axils suddenly abort and form suckers or young plants instead of racemes. This phenomenon is a common occurrence in the bushhouse and can be a curse when it happens to a potential show winner. I have read reports that this is nature's response to excessive winter watering and I suspect this reasoning to be correct. If so, this knowledge could be a useful aid in the propagation of desirable clones — it is far simpler and cheaper than setting up a backyard laboratory. Juvenile racemes are obviously a logical source of material for use in meristematic tissue culture. Tissue used in 'mericloning' must be obtained before the cells in a growing tip have been programmed to perform a selective function for the mother plant, such as roots, flowers, etc. By taking the tissue from the infant racemes, the general well-being of the specimen plant is not affected as it would be if the leaf crown or root tips were utilised. Mass germination of seed on a suitable trunk or limb is another way in which keiki-like clumps are formed. The seed is very likely to originate from various parents however, and the flowers in a clump may be very different from plant to plant.

The beautiful white flowers of *S. falcatus* have caused it to be known universally as the 'Orange Blossom Orchid'. It is the colouring on the labellum however, that really catches the eye of the observer. In the type form, the large side lobes of the labellum are varying shades of yellow, from very pale all the way up to an intense mustard colour. There is usually some degree of purple striping overlaying the yellow. On plants with the deep mustard side lobes, the striping may be indistinguishable. The tip, or spur, of the labellum may be totally white or horizontally striped with purple, from a few faint markings, to so many that they appear to be a solid bar of purple. When the deep mustard colour combines with the heavy purple striping it is easy to understand why *S. falcatus* is the favourite species of many novices and enthusiasts alike. Botanically, *S. falcatus* has only one form; that is of course, the 'type form'. Horticulturists acknowledge a second form however, and when growers get together for a show or a meeting they refer to it as 'the Big White Form'. It differs from the type form in four main ways: Colour, size, flowering season and perfume.

As its common name suggests, white is the predominate colour but, when closer examination is made, two other colours become apparent. The side lobes of the labellum have pale yellow patches with very faint purple striping and the reverse of the tepals have a narrow line of a purplish hue on the centre ridge of each. The big 'white form' has considerably larger flowers than the type form. The largest 'type form' flowers are generally a similar size to average 'white form' flowers. Big whites can have flowers of nearly 4cms diameter. More will be said about size later. This form flowers at least a month later than the 'type form' and it would be quite rare if a big white plant were to be found with open blooms before November — when most 'type form' plants would have finished. I cannot recall having seen both forms flowering at the same time in the same locality even though they occasionally grow side by side. The final difference is perfume. While the type form has powerful and very sweet perfume, the big white form is quite the opposite. Its perfume is not nearly as powerful but is easily detected all the same. Its smell is quite unpleasant and has been described as similar to a tuberous vegetable.

Botanists consider these differences to be insufficiently distinct to warrant the establishment of a separate variety. In 1888, R.D. Fitzgerald gave the 'white form' species status when he named it *Sarcochilus montanus.* He later changed it to *S. falcatus* var. *montanus* in 1893. This distinction was later abandoned altogether. I am uncertain of the northern limit of distribution of this form but I do have several plants from the Toowoomba district of Southern Queensland. It definately occurs inland from Gosford on the N.S.W. central coast and this would be its southern limit I suspect. It is not uncommon at all but is sporadic in distribution and may be locally dominating.

The flower of *S. falcatus* ranges in size from a tiny 1.5cms up to giants of nearly 4cms. If it was possible to give an average size I would think that 2.2 to 2.6cms would be close enough but flowers to 3cms would not be uncommon. As a guide (not infallible) small immature plants blooming for only the first or second time tend to have smallish flowers. In one particular habitat, I have noticed that small flowers predominate and that a 2cm bloom could be considered as large. I refer to that wet transitional type forest that borders on the head-waters of cool temperate rainforests gullies and valleys. Such habitat contains an abundance of smooth barked trees, usually only half grown, such as Sassafras and Coachwood. Such areas always appear to be good orchid territory but after a lot of energy has been expanded, the searcher invariably ends up disappointed with the orchid flora present. Within this habitat it is common to see many small plants of *S. falcatus* clinging to the moss-free trunks. Many of these plants are not youngsters despite a superficial resemblance to seedlings ... they just do not often grow to large or even average proportions. The absence of lichen and moss means a diminished supply of moisture and nutrients and so most plants remain stunted with about three or four short but stout leaves at best. Flowering stimulus is apparently low because many plants have never flowered or flower only infrequently. Close inspection will reveal these facts easily. Plants that are observed in bloom mostly display four or five tiny starry flowers on short racemes. Definately not breeding stock but fanatics like yours truly can usually see their good side.

At the other end of the scale some huge individual flowers can be found. There is no doubt that the big white form has the biggest flowers by a country mile. Its flowers often reach 3.5cms in diameter and frequently have well filled in segments of thick texture. The best specimen of this form I have seen, was benched at the Sydney Group Spring Show of 1983. This was a large keiki grown by Mike Harrison and its flowers were only a millimetre or so under 4cms.

The flowers of the type variety can be considered very large if they exceed 3cms in diameter. A plant I found in the southern Illawarra region in 1978 was exactly 3.5cms across. This is exceptional and was possibly due to the fact that there were only three flowers on a short raceme. I have noticed over the years that the size of the flowers on this plant have decreased to just under 3cms but that it now sends out at least two racemes each Spring, with up to nine flowers on board. The plant remains healthy and full of vitality. I suspect that the increase in flowers is responsible for the decrease in flower size. In the future, this specimen will receive heavy fertilisation in an effort to revive its former glory. I am not hopeful; maybe I should nip the raceme in half to see if that would help.

The racemes of *S. falcatus* can reach 18cms or so in length although 10 to 15cms would be a good average. There may be up to 12 flowers on each raceme and naturally enough the number of flowers will dictate the length of the raceme. As with many species, length is also governed by the flower spacing. Racemes can be nearly straight or zig-zaged, either slightly or greatly. One of my plants has the unusual but attractive habit of shooting off alternately left and right at sharp angles from where each flower attaches to the rhachis. This action bunches flowers up considerably and when four or five racemes are present the effect is stunning. Conversely, some racemes are perfectly straight with the blooms all rising on a single plane, something like a picket fence. The racemes of *S. falcatus* usually curve gracefully downwards in a gentle arc and are quite rigid, only rarely flaccid. Occasional plants have nearly horizontal racemes.

Depending on the age of the plant, there is usually from one to six racemes with the odd monster plant displaying up to a dozen. The spent racemes of *S. falcatus* dry out to a jet black colour and persist for several seasons. No other member of the genus has this characteristic and this knowledge is a useful aid in field identification of young plants which can be confused with several other species such as *S. weinthalii* and *Pteroceras spathulatus.*

I, for one, am addicted to the perfume of *S. falcatus.* When it is flowering in my bushhouse I am forever stealing a deep wiff from every plant I walk past. I always stick my nostrils in any orchids I happen upon (I get some strange looks from people who catch me in the act). Perfume to me is just about the greatest asset an orchid can have. This is why I grow natives instead of those refugee orchids from over the seas, although to be excessively fair, I have to admit that the occasional immigrant does have superb perfume. (That's all the concessions I'm prepared to make, no more Mr Nice Guy!) *S. falcatus* is high on the list when it comes to perfume, both in sweetness and strength. The white form perfume I have already discussed. The type form comes with two distinct fragrances. One seems identical to vanilla essence. The other resembles perhaps an exquisite french perfume of some kind. In my experience, the latter is more commonly encountered.

Each fragrance is so vastly different that one would never suspect that they originate from the same species of plant life. There is plenty of scope here for an inquisitive researcher to do a study on the fragrances of this orchid ... many very puzzling questions have not as yet been answered. For instance, can anyone think of another plant, orchid or not, that emits more than one distinct fragrance, let alone three? How on earth does the pollinator of *S. falcatus* perform its duties? Is it attracted to each of the three fragrances? Has a separate pollinator evolved to deal with each fragrance? Is perfume the attractant mechanism for ensuring pollination? There are many questions to be answered.

I have heard it said that the vanilla fragrance is restricted to those plants having purple markings on the labellum. This is not totally correct. Although it is true in the majority of cases, the two 'type form' fragrances occur in all colour combinations of the flowers, the big 'white form' apart of course. Another point worth mentioning is that the vanilla fragrance is apparently absent from the Illawarra. I have never once found a plant down there of this fragrance despite a very sound knowledge of the area. Elsewhere the two frequently grow side by side. I do not own a plant from Victoria and have no idea what perfume occurs in that State.

Cultivation: A big part of the reason why I have a passion for *S. falcatus* must be due to the good fortune I experience with its cultivation. To put it simply, I don't grow it as much as it grows for me. There are some species of native orchids that I have to work hard at growing — *Dendrobium linguiforme* is a horror for me. All growers have their 'bogey' species and it can be frustrating to visit the collections of other people and see them growing your problem species to perfection while you lament your miserable runts back home. Several times visitors to my bushhouse have told me my "Orange Blossoms" look splendid and ask what my secret method is. Whilst I would love to 'big note' myself by rattling off a prepared dialogue about my marvelous talents, I just shrug my shoulders and say "damned if I know". Actually, I do know, but it is difficult to expand on the subject during a stroll through the bushhouse while the kids are fighting and the dogs next door are barking themselves silly. Most growers experience no particular problems with *S. falcatus,* but there is a small percentage who cannot keep it growing for more than a year or so. The same growers probably grow *D. linguiform* to perfection. I believe that, as with most native orchids, a thorough understanding of the species' environmental preferences will go nearly all the way to towards attaining satisfactory cultivation techniques. I realise this is not a world shattering revelation but it is surprising just how many growers ignore some of the basic rules or fail to recognise obvious errors in judgement when a plant becomes unwell.

Of all the *S. falcatus* deaths in the bushhouse of Australia, the vast majority succumb to a black rot that destroys the crown. If starts on the tip of the most juvenile leaf and quickly eats its way into the heart of the crown. This is a fungal problem and as the old proverb says, prevention is better than cure. A preventative fungicide such as Benlate(R) should prove effective if used regularly during the summer and autumn when this problem is most likely to occur. Once the young leaf shows signs of blackening, it is usually too late for systemic fungicides such as Fongerid(R). Cultural control is far more desirable than chemical control and it is here that success will be found. The cause of the black rot is undoubtedly the result of excessive moisture, either because of over watering or high rainfall. *S. falcatus* is a comparatively robust orchid and quite capable of withstanding long periods without direct watering, provided that the plant is positioned in a cool, airy spot. It is a popular misconception that *S. falcatus* is a species that must receive high moisture levels. I find it thrives if treated in a similar manner to cool growing Dendrobiums with the exception of light levels. I do not advocate growing it in more than 50% light and under a 70% shadecloth would be the optimum. If a slightly humid atmosphere is maintained, and this can be achieved by ensuring a damp floor in the bushhouse particularly in warmer weather, then watering can be reduced considerably. At the height of summer it will still be necessary to water frequently of course, but once the mercury falls, cut back on the watering correspondingly. Using this recipe, it will only be necessary to lightly water every seven to ten days in winter and early spring. Other *Sarcanthinae* species require far more frequent watering, so do not treat them all the same way. For this reason I keep all my "Orange Blossoms" on a wall by themselves so that I can water moisture reliant species as required without wetting the *S. falcatus*. Air movement is the other major factor to consider when hoping to avoid black rot. *S. falcatus* is the same as most other species in this regard, it must have good air movement around it. An abundance of air will go a long way towards eliminating moisture build-up around the crown. If you have trouble with this complaint it could be that your bushhouse is stuck between the house and the garage or garden shed or similar, where air does not circulate. Black rot invariably destroys the crown of the plant to the point where recovery is but a dream of the grower. *S. falcatus* will not regenerate from the crown as other *Sarcanthinae* species can, *S. australis* and *Papillilabium beckleri* for example. Fortunately, it will often keiki in the leaf axils, as previously described, so that the death of the main plant does not always mean the end of the clone. If keikis do not develop, the crownless plant will slowly lose vitality and shrivel up. It may even bloom before finally 'tossing in the towel'.

Another problem my plants have recently suffered from is leaf borer. This is a minute pest that can cause considerable damage if left unchecked for too long. I had seen tiny holes on the surfaces of mature leaves but had ignored them. I did not realise what the offender was until I pointed it out to a well-informed grower who was able to diagnose the problem. An application of a systemic insecticide such as Rogor(R) is the way to treat this annoying little pest. Mealy-bug is another problem common to many orchids and *S. falcatus* is certainly no exception. Rogor is also suitable for controlling this pest. Several species of scale often lodge in the leaf axils and are actually cultivated by ants who thrive on the sticky 'honeydew' secretion of the scales. Get them before they become too prolific; they are easily removed using a handy twig or piece of wire. Scale should never be left unchecked long enough to become such a pest that chemical control is necessary. If you are not diligent enough white oil is the right thing to use.

Fertilise as for other species. That is, little but frequently, using any of the well known organic or inorganic water soluble products available. Lately I have been using Fish Emulsion, purely because someone gave me a bottle of it. It is too soon to comment on its effectiveness. I also apply heavy doses of root hormone about twice a year. I use Formula 20 (R) because it is cheap and will not harm plants or flowers unless used undiluted.

To be continued in the June issue.

2 April, 1985

Gerry Walsh
7 Leslie Court,
Werrington 2760.

Who's Who

A Directory to the Australasian Native Orchid Society —Its Officers and Group Contacts

President: R. Gifford; **Vice President:** M.J. Corrigan; **Secretary:** M. Harrison; **Treasurer:** Erhard Husted; **Editors:** M. Spence, M. Penberthy; **Councillors:** A. Peck, S. Herd, G. Walsh, R. Trevenar, J. Kavulak, A. van Bysterveld.

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A.N.O.S., Box C. 106, P.O. Clarence Street,
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ANOS Groups and Affiliated Native Orchid Societies.

NEW SOUTH WALES

- **Port Hacking Group** — Tel: (02) 524 9996. Meets 8 p.m. 4th Tuesday each month at Community Hall, Gymea Bay Road, Gymea.
- **Sydney group — Tel: 888 5936 (Joan Hamel)** Meets 8 p.m. 3rd Friday each month at Lady Game Community Centre, Moore Avenue and Bradfield Road, West Lindfield.
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Notice of ANOS Annual General Meeting

Members are advised that the 23rd Annual General Meeting of the Australasian Native Orchid Society will be held on Saturday, 16 August 1986 at 10 a.m. in the Maiden Theatre, Royal Botanic Gardens, Sydney. (Entry via Mrs Macquarie's Road is suggested.)

Members may vote by being present at the meeting or by completing a proxy form and lodging it with the Hon. Secretary not less than 48 hours before the meeting.

A meeting of Delegates from ANOS Groups and affiliated native orchid societies, comprising the ANOS Advisory Committee, will commence at 1.30 p.m. on that day at the same venue.

M. Harrison
Hon. Secretary

Consolidated Index Vols. I - V: This index has now been printed and is being distributed. Only a limited number of this invaluable tool has been printed so we recommend early placement of orders.

The price is $6.50 plus postage.

Central Coast Group A.N.O.S. will be holding their Annual Spring Show on Saturday and Sunday, 13th and 14th September, 1986 at the Scout Hall, Gertrude Place, Gosford. Open 10 a.m. to 4 p.m.

Notice of Motion for 1986 A.N.O.S. Advisory Committee Meeting

Warringah Group of A.N.O.S. submits a motion to be included in the agenda for the 1986 meeting of the Advisory Committee of A.N.O.S.

> That the Executive Committee of A.N.O.S. take immediate steps to institute a system of awards as provided in para 1 (ix) of the A.N.O.S. Constitution.
>
> That the awards be selected by the judging panel from the "Recommendations for standardized citation of awards, certificates and medals" as listed in "The Handbook on Orchid Nomenclature and Registration" 3rd edition (rev.) 1985, published by the International Orchid Commission.
>
> That the AOC, OCSA, OSWA, QOS, STOCQ, TASM, NSW and VIC Orchid Societies be advised of A.N.O.S. intentions.
>
> That the Handbook Committee, c/-The Royal Horticultural Society, Vincent Square, London SW1P 2PE, England be written to request that the Australasian Native Orchid Society be listed as an awarding society and the abbreviation to be used be ANOS.

Corrigenda: On the first inside colour page of the December 1985 issue the caption to Fig. 3 should read "*Thelymitra villosa* x *T. nuda* with backcross and *T. nuda*". *T. nuda* is the plant on the right.

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The Genus *Microtis* in Australia

by R. Bates

Introduction:

Microtis R. Br. has recently been revised (Bates 1984) and is considered to have 9 species, 8 of them Australian.

History

The genus dates from 1810 when Robert Brown described five species in his Prodromus. Brown's part in the history of *Microtis* goes back to December 1801 when as botanist during Matthew Flinders' circumnavigation of Australia he collected in the swampy country around King George Sound (Albany) in Western Australia. Orchids were in profusion as the natives had burnt these swamps the previous summer. Brown collected four *Microtis* here and named them *M. alba, M. media, M. pulchella* and *M. rara.* He collected more Microtis around Sydney in 1803 including *M. rara* and another species which he named *M. parviflora.*

But the history of one species goes back further to 1786 when Forster named plants from New Zealand as *Ophrys unifolia.* These same plants were later renamed *Epipactis porrifolia* by Schwartz in 1800, but of course they were not Ophrys or Epipactis. Brown recognised this in 1810 but began a long period of confusion when he noted that *Ophrys unifolia* was really one of his *Microtis* but didn't say which one! It is now known that *O. unifolia* is the same as Brown's *M. media* but according to the rules of botanical nomenclature the earliest *species* name must be used so *Microtis unifolia* is the accepted name. Brown began further confusion by not mentioning in his Prodromus that he had collected *M. rara* at King George Sound as well as near Sydney, leaving the way open for Reichenbach in 1871 to re-name the western collection as *M. brownii.*

This brief history of course oversimplifies the facts but after a century of confusion we now have eight recognised species: five of Brown's, plus *Microtis atrata* named by Lindley in 1840, *M. orbicularis* by Rogers in 1907, and the most recent addition *M. globula* described for the first time in 1984.

Common Names: All species are generally known as onion orchids because of their hollow cylindrical leaves which exude mucilage if broken.

Biology

Growth: *Microtis* are terrestrials, perennating in late summer as small tubers; the dormant period ranging from five months for *M. unifolia* in dry environments to less than a month for several species growing in swamps. Tubers sprout in the autumn, growth is slow during the winter (except in hot or dry environments) but rapid during spring; the flower spike bursts from the tubular leaf just before flowering which can be as early as August for *M. parviflora* in inland Western Australia or as late as January for *M. rara* in sub-alpine areas. Flower-spikes may have up to 150 flowers which begin opening from the bottom of the spike first and by the time the top flowers open the lower ones may have already released their seed!

Pollination:

As far as reproduction from seed is concerned *Microtis* do not 'put all their eggs (ova) in one basket' but use a triple chance system. Firstly the flowers are 'designed' for pollination by small insects. The flowers have a 'nectary' at the base of the labellum and many are lightly perfumed. Because the plants are colonial with numerous down-facing flowers one would expect them to be pollinated by gregarious, low-flying or crawling insects. Observation in the field has shown *Microtis* flowers are commonly visited by flies, beetles, ants and small wasps and the latter two are often observed to transfer pollinia although only wasps are regularly successful in effecting outcrossing, as ants tend to transfer pollinia to flowers on the same spike. Jones (1975) documented the pollination of *M. parviflora* in Victoria by small ants (Iridomyrmex sp.). The ants, attracted by nectar, had the viscidium of the orchid cemented to their frons while feeding and on visits to subsequent flowers the pollen mossulae were stripped away layer by layer. The author (1981) has described how tiny wasps transfer pollinia from one spike to another effecting outcrossing.

If insects do not bring about pollination the flowers of many species will self-pollinate. This autogamy is brought about by the pollinia collapsing onto the stigma which actually expands upwards to receive them.

Insects on the flowers often dislodge the pollinia so that they do not contact the stigma and yet these flowers still produce seed. The process is known as apomixis or the asexual production of seed. One species *M. unifolia* is known to use all three systems for seed production and it is likely that the others do also as rarely will a plant be found that does not have viable seed formed in every capsule!

Not only do most *Microtis* have a "triple chance" seed production strategy they can also increase vegetatively and species such as *M. unifolia, M. parviflora* and *M. rara* can form huge clonal colonies this way.

Fire stimulation:

All species flower more profusely after a fire and two, *M. pulchella* and *M. globula,* have only been observed to flower 9-12 months after a late summer fire. Burning of the surrounding vegetation increases the amount of light and boosts potassium and phosphorus in the mineral deficient soils in which these species grow, but it seems likely that some other physiological stimulus may be involved as the author has *M. pulchella* in cultivation and despite providing light and mineral additives the plants do not flower. What is even more interesting is that they **do not produce leaves** either, merely subsisting as underground tubers and rootlets.

The Species:

1. ***Microtis unifolia:*** This is one of the most common and widespread Australian orchids; growing from coastal dunes and offshore islands to the sub-alpine zone, from permanent bogs to dry rock outcrops and creeks far inland. It also occurs in New Zealand, New Caledonia and eastern Asia. It is often reported coming up in lawns, hanging baskets and on golfcourses. It almost has the potential to become a weed! It can best be recognised by its short oblong labellum which has calli at the base and at the truncate or bifid apex. Flowers are numerous and crowded, green or yellow green and many forms are known.

2. ***M. parviflora:*** This is less common and more restricted, usually found in damp grassy places but also known from areas around rock outcrops far inland where water collects, i.e. north of Mt Magnet in Western Australia and west of the Warrumbungles in New South Wales. It is a more constant species normally with smaller flowers than the previous, the labellum triangular with a down-turned apiculus and no calli at the tip, the whole plant often a deep green.

3. ***Microtis rara:*** Is even less common and found mainly in damp, relatively cool sites. Its occurrence in some areas is often not detected until after bush fires when dense colonies of up to 1000 plants all flower at once. It can be recognised by its few widely spaced flowers and the very long labellum which is usually as long as the ovary and pressed back against it. Flowers have a stronger perfume than the previous species.

4. ***Microtis alba:*** This is the most attractive species restricted to the south-west of Western Australia, usually within 100km of the coast. The late flowered tall forest forms live up to their name in being white flowered but other forms from coastal heathland have short dense spikes with pale green flowers but what these lack in colour they make up for in their fragrance which is reminiscent of dried apricots. The labellum of *M. alba* has the apex divided into two lobes.

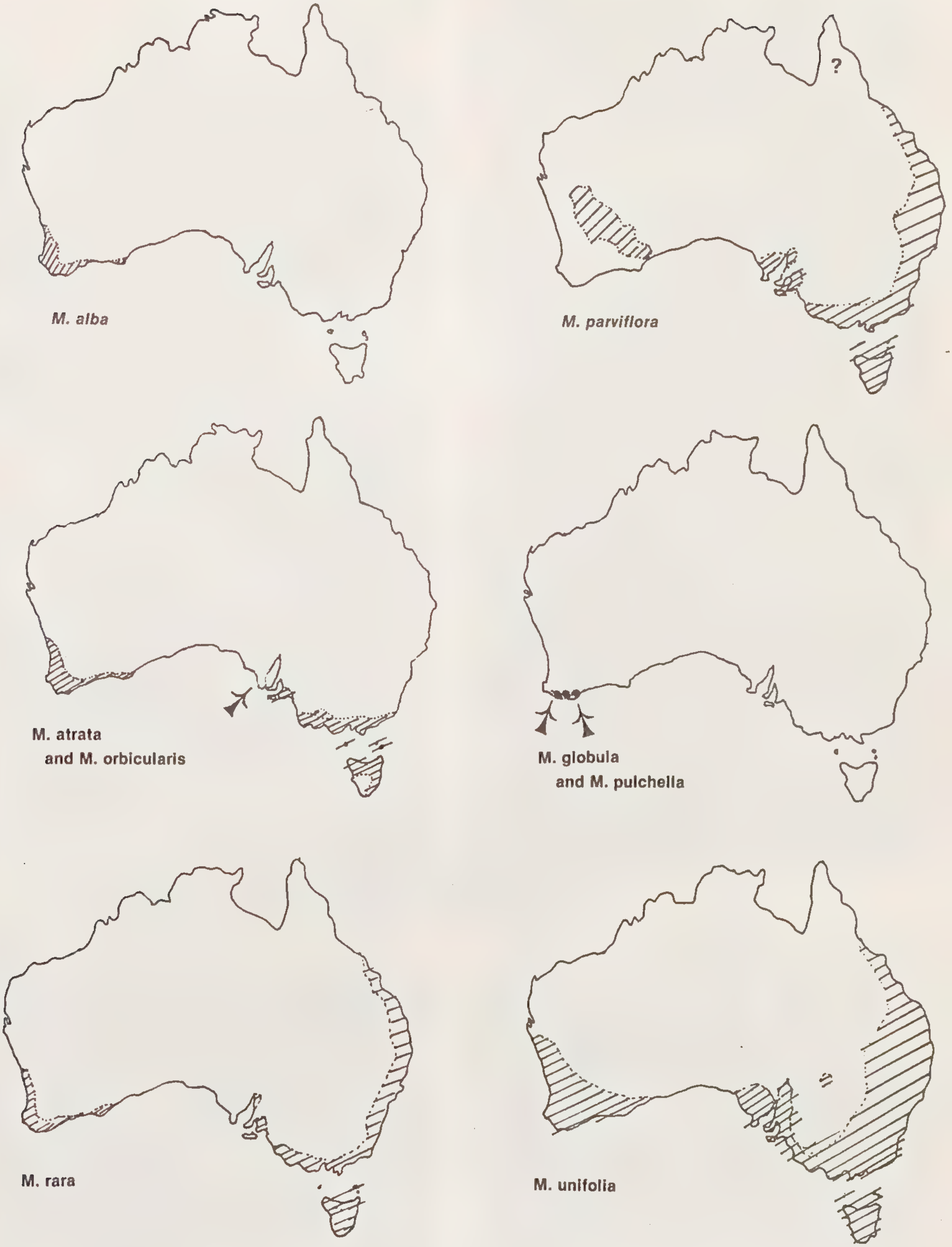
5. ***M. atrata:*** This is the smallest species and occurs only in soil which is boggy in winter One really needs a magnifying glass to see the minute flowers which have an oval shaped labellum and no calli but lines of little granular excrescences which turn black on older flowers. Actually the whole plant turns black once it is dried (hence the specific name '*atrata*' which means blackened).

6. ***M. orbicularis:*** This species could be regarded as semi-aquatic as it grows in waterholes, the first flowers opening just above water level as the swamp dries out. It is quite rare despite being widespread. At Lake Muir in Western Australia however there must be something like 50,000 plants around the shore. The name *Orbicularis* refers to the shape of the labellum which has no calli. This is the only species to have red tints, both flowers and stem commonly being reddish.

7. ***M. pulchella:*** (See colour pages, Fig. 2.) Although rare and restricted this beautiful white flowered species seems to be well conserved. As mentioned, plants only appear above ground after bushfires. The late flowering time (December-January) ensures that they are rarely seen by the average visitor to their swampy heathland habitat near Walpole and Albany in Western Australia.

8. ***M. globula:*** (See colour pages, Fig 1.) The existence of this species seems to have been first recognised by Ron Heberle of Albany less than 15 years ago. It appears to be quite rare but fortunately all known colonies are in conservation parks. It was hidden from science for such a long time because, like *M. pulchella,* it does not appear above ground except after bushfires, but unlike that species the flowers are small and green; altogether an insignificant

Distribution of *Microtis* Species in Australia



M. alba

M. parviflora

M. atrata
and M. orbicularis

M. globula
and M. pulchella

M. rara

M. unifolia

plant. The name '*globula*' refers to the flower shape, the sepals and petals all curve inward to give the flowers a globular appearance. The only plants seen by the author were found to have thick fleshy rhizome-like roots and tiny tubers but this is a feature of some other orchids found in nutrient-deficient peat bogs (i.e. *Calochilus campestris* and *Prasophyllum gibbosum*) and may not be consistent for the species.

Hybrids and Microspecies:

It is believed that hybrids do occur between species of the *M. unifolia* alliance i.e. *M. parviflora* x *M. unifolia, M. alba* x *M. unifolia, M. rara* x *M. unifolia* and *M. parviflora* x *M. rara.* The evidence is largely circumstantial but the existence of these intermediate forms in disturbed areas and their virtual absence at undisturbed sites is strong evidence. Insects have actually been observed to transfer pollinia from one species to another (Bates 1981) and one cross has been man-made (*M. parviflora* x *M. rara*). This cross flowered for the first time in October 1985 and looks like a large deep-green, fleshy flowered form of *M. unifolia* being identical with suspected natural hybrids found in heavily grazed swampland in south-eastern Australia. As most of the hybrids produce fertile seed by autogamous means and apparently by apomixis these hybrids are able to set up large pure populations. Such populations can be termed micro-species. It is possible that some of the many synonyms of *M. parviflora* and *M. unifolia* are actually microspecies.

Besides these hybrid forms there do appear to be one or two 'new' species in the south-west of Western Australia, confined to coastal swamps and rarely flowering. All will require detailed ecological and biological studies before they are confirmed and named.

Cultivation:

The species to have done best in cultivation are the two 'weeds' *M. unifolia* and *M. parviflora.* These flower and increase prolifically in pot culture. It is necessary to remove the flower spikes before seed is released to prevent them infiltrating pots of other orchids. *M. rara* and *M. alba* also do well but are shy flowerers. A technique recently suggested to me by Kingsley Dixon of Kings Park, Perth, is to place the tubers (or whole pot) in a paper bag with a ripe banana. The ethylene gas produced stimulates flowering in many orchid species. All other species have been cultivated but could be described as "difficult". In any case Microtis is never likely to be a really popular genus in cultivation because of its small flowers. My choice of best Microtis for growing is the tall forest form of *M. alba* which should be on the tuber bank list of several societies this year.

References:

Bates, R. (1981) 'Observation of pollen vectors on a hybrid swarm of *Microtis* R.Br.' *Orchadian 7:14-15.*

Bates, R. (1984) 'The genus Microtis R.B . (Orchidaceae): A taxonomic revision with notes on biology" *J. Ad. Bot. Gdns.*

Jones, D.L. (1975) "The pollination of *Microtis parviflora* R.Br." *Ann. Bot.* 39:585-589.

Holmes, J. (1986) "Orchids and Fire" *South African Orchid Society Journal* 17:8-9.

38 Pontmarnock St.
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28 May, 1986

Sarcochilus falcatus

Continued from the March issue.

by Gerry Walsh

S. falcatus can develop an extensive root system in cultivation. The roots do not necessarily grow to great lengths but are usually numerous and quite long lasting. It is therefore imperative that plants are mounted on an artificial host that is very long lasting from the beginning. Too often growers attach their plants to mounts that are just too small to maintain an extensive root system beyond a few years. There is little point in establishing a prized plant on a small host that will not provide an adequate home for long before remounting becomes necessary. Remounting is damaging and completely unnecessary if some attention is paid to the long term requirements of the orchid.

It is often the shape of the slab being used that can have the biggest bearing on successful cultivation. Make sure you use a long narrow host and steer clear of tree rounds and square mounts etc. A mount of 20cms x 10cms is nowhere near as suitable as one that is 40cms x 5cms. Simple arithmetic tells us that the area of each is the same, but the long narrow example is the best. It allows the roots of the plant to spread out and breathe.

Slabs of old weathered hardwood are very good if you can get a supply of them, but be confident they have not been treated with creosote or similar before you start messing with them. They also have the advantage of slight moisture retention and nutrient availability. Old fence palings can be used so long as they are not too old. Remember, your aim is to avoid having to re-establish your plants.

Another host I have tried and found to be excellent is Ironbark totems, like those used for indoor plants that need support. These can be purchased cheaply in a wide range of sizes. Choose the type that has flakey or fibrous bark. Do not take chances with the hard barked types that often have sappy residues exuding from the deep fissures.

Another suitable host is split hardwood. An offcut of an old fence post (4″ x 2″ in pounds, shillings and pence) of any length, will yield five or six slabs with an almost unlimited life expectancy. A good length would be 30 to 40cms (12″ to 16″). Split timber is far better than sawn timber because it leaves a rough surface on which the orchid roots can attach themselves to securely. And to be honest, it looks better. Split slabs will last indefinately but the unweathered surface does not provide nutrients or moisture retention. This is the responsibility of the grower.

Tree fern fibre is a suitable host for many of our native orchids and I have tried most temperate species on it at one time or another. However, *S. falcatus* definitely has an aversion to this material and does poorly when attached to it. Death has not occurred but a distinct retardation of the root tips is obvious. This shows itself by 'knotting' of the root tips and frequent changes in direction for no apparent reason. I have found the pH of tree fern fibre to be too low (acid) and even when thoroughly washed in lime water its value must be suspect where *S. falcatus* is concerned.

Cork is a very popular host these days and is quite acceptable to the roots of most native orchids. Use the natural cork bark and forget the compressed or granulated cork board. The latter is strictly a short term host only and it can break down in a surprisingly short time. Nurseries use it like sliced bread. This is understandable because it is easy to work with and is very lightweight which cuts down transport costs. Natural cork can be long lasting and reusable and looks very good. I used it extensively a few years ago but lately I have drifted away from it altogether. For a start it is quite expensive and I find the small cracks and cavities are a haven for a whole range of insect pests. Over the years my cork slabs have played host to small brown ants and small black ants (which attract scale), caterpillars of all colours and sizes and at least two species of borers that proved very difficult to eradicate. Only a few days ago I noticed a fine clump of *Bulbophyllum elisae,* growing on natural cork, looking a bit different. I found a large amount of chewed up cork and frass under the extensive root system. Half the clump fell off when gently touched ... borers had destroyed four years of growth and wrecked the cork! Now I must start from 'scratch'. Less damaging pests, but quite unnerving ones, such as earwigs and assorted spiders (including 'Redbacks') cause concern for the unwary. Those small flying brown cockroaches are at home as well. I am told that these feed on root tips, flower buds and young leaves.

Many growers advocate the use of paperbark poles as a native orchid host. My experiments with it have not been extensive but my few attempts have been unsuccessful. I am sure that success depends to some degree on what species of paperbark tree you happen to pick. Australia has hundreds of them to select from and apparently I have not been picking the good ones. Results in the first two years of use were encouraging, but, after a time, the bark layers either separated, loosening the orchid's grip, or they went mushy and held excessive moisture. The wood in the centre of the pole has been infested with a borer in many cases. Some growers burn the exposed ends of the poles because this inhibits the entry of the borers and this practice apparently works well. If you are using paperbark with success, stick with it, there is no sense in changing a winning formula. If you are not satisfied, try something different, before it is too late.

I have assumed in this discussion on mounting material, that every grower would surely be using 'slab culture' when cultivating *S. falcatus.* Now I hear that at least two acquaintances in the native orchid business have been entombing this beautiful species in pots! While these plants are growing well under this type of cultivation, I fail to see the need to apply the technique at all. Part of the majesty of growing *S. falcatus* is seeing those glorious creeping roots inch their way across the mount — actually seeing what your plant is up to — not merely wondering about what is going on. *S. falcatus* has a pendulous raceme habit and its beauty could not be enhanced by flopping it over the side of a pot.

One final point I would like to discuss before leaving the topic of mounts is moss. Before mounting orchids, I now attach a layer of 'bush' moss to the surface of the mounting material. The moss I refer to is the type that envelopes the trees in most rainforest gullies and creeks. It is a yellow-green colour and often hangs down in long thick masses. I use enough to cover the mount loosely and do not compact it down. Then I position the orchid on top and tie it on as usual. Do not cover the roots at all, let the plant decide where it wants to send them. The moss remains moist for several hours after watering and helps to create the humidity and coolness that *S. falcatus* loves so much. The aesthetic appearance of the moss is a bonus. Sphagnum moss is not the same thing and should be avoided; it stays too wet for too long and is not as attractive as the 'living' thing.

Hybridising: It will probably surprise many people to learn that there has only been two hybrids registered in which *S. falcatus* is a parent. These are *Sarcochilus* Melba (*S. hartmannii* x *S. falcatus*) and *Sarcochilus* Phyllis (*S. ceciliae* x *S. falcatus*). It is even more surprising to learn that not one *Sarcochilus* hybrid has been registered in which both parents are epiphytic species. Every hybrid so far registered has one of the lithophytic species, *S. hartmannii, S. ceciliae, S. fitzgeraldii,* as a parent. One hybridiser told me that the reason for this was that, in most cases, the seed resulting from a cross of two epiphytic species is rarely, if ever fertile. Also, it is not unusual to have seed pods that are devoid of seed at all. When this was expressed to me, I admit that I was full of scepticism. I preferred to believe that no one had as yet crossed two epiphytic species. *Sarcochilus* hybridising is, after all, a relatively new field, with lots of possibilities yet to go into the flask. I am not going to enter into the reasons behind hybridising or the long term plans for improving them. I do not believe, however, that a hybrid should be made just because if has not as yet been registered. I do think that superior clones should be chosen as parents in hybrids, and that any old plant should not be used simply because it is in flower at a convenient time.

Ignoring my friends warning, last spring I was determined to create my own hybrid, or at least attempt to. It had always seemed to me that a crossing of *S. falcatus* and *S. weinthalii* would produce beautiful flowers. So I crossed them using a type form plant of *S. falcatus* having huge glistening white flowers as the pod parent. I had visions of a 2cm diameter slightly cupped flower with dark spotting over the tepals. Two pods formed quickly and grew with great haste into bulging proportions. They split open at Christmas time, quite early for *Sarcochilus* pods, and it was very disappointing to find that there was not a single seed to be seen. I had created two fat, green but totally worthless hybrid pods! My friend was correct in his theory. Next year *S. falcatus* will be crossed with *S. hillii* in a quest for a 2cm pale pink bloom. No hope for success? Only time will tell. If only the great Ira Butler was still around. It would be fascinating to know why such a perceptive grower as Ira could not see any merit in a strictly epiphytic cross. Perhaps he was unable to obtain fertile seed. I find it difficult to accept that the thought to cross them did not enter his head. It could be that the clumping habit of the lithophytic species, combined with the assumed hybrid vigour of the offspring, would provide an easy and fast method of propagation. This would indeed by a large 'carrot' to tempt the hybridiser. Now that most combinations of the lithophytic species have been experimented with, we may be lucky enough to see some new directions being investigated in the hybridising of this wonderful branch of the orchid 'tree'. If so, *S. falcatus* will become a real force to be reckoned with. In the mean time, it will always remain a fine native orchid ... and my favourite species.

Gerry Walsh
7 Leslie Court,
Werrington 2760.

2 April, 1985

Dipodium punctatum (Smith) R. Br. — Alba Form in East Gippsland

by P.B. Adams

The colour forms of *Dipodium punctatum* (Hyacinth Orchid) in far East Gippsland show a remarkable variation in background floral colour and spotting. The uncommon finding of pure white flowering plants is reported. A green seed capsule developed on one plant, indicating that white flower colour does not restrict natural pollination.

Dipodium punctatum is the most variable and widespread of the five species of the genus represented in Australia. The mature plant, a leafless saprophyte, bears a striking flower spike up to a metre in height. Jones and Logan (1971) described a **large** and **small** variety in the Sydney area. The small variety has thinner stems up to 0.5 metres tall, are green to black at the base, and red-pink at the apex. In the open forests and heathlands of East Gippsland, most plants are of the **large** variety, with thick dark brown-red flower spikes bearing evenly spaced flowers in the upper half. There are a few smaller plants with a terminal cluster of smaller flowers, fitting the description of the **small** variety given by Clements in his 1979 review of the genus.

East Gippsland, as in other parts of the distribution range from South Australia through Victoria, New South Wales and north Queensland, it is easy to note the colour of hundreds of individual plants in a walk of a mile or two during mid to late summer. The predominant colour is pink of various shades, either in plain colour or with various intensity of spotting with red, brown and purple. Clements records that pure white forms have been found at Upper Sturt in the Mount Lofty Ranges, South Australia, and at Cleveland in Queensland. In reviewing the literature on *D. punctatum* I have not found other reports of white flowering plants, and until recently had not seen a white Victorian plant in observing thousands of these plants at many locations in the past ten years.

Report of Alba Form

Habitat Description

Dry open forest of red bloodwood (*Eucalyptus gummifera*) and mixed stringybarks in the eastern sector of Croajingalong National Park. The soil is sandy, compacting solidly in the deeper horizons and supporting a ground cover of grasses and small heath species. Other plants flowering in late January 1986 were Geebung (*Persoonia sp.*) fan-flower (*Scaevola sp.*) and the orchids *Cryptostylis subulata, Orthoceras strictum,* and *Eriochilus cucullatus.*

Range of Colour Forms of *D. punctatum*

A large population of *D. punctatum* was examined following an initial report of white flowering plants by Mrs. Lee Coke. Only two white flowering plants were found among many hundreds of spikes with pale to mid pink flowers. The pink flowered stems were very dark brown, and most flowers were variably but heavily spotted with red and purple (Fig. 1,5). Flower count varied from 7 to 62 per spike. About 10% of these flowers were entirely devoid of spotting or streaking with more intense colour.

The stems bearing white flowers were entirely green in colour (Fig. 4); one had nine flowers and the other 19 of identical form to the pink flowers in the area. These white flowering plants were a true *alba* form, the only trace of colour residing in the yellow of the pollinia.

Pollination

Dipodium has compact pollinia, hyaline caudicles and a sticky viscidium, and requires an insect vector for pollination. The nine-flowered spike developed a large light green seed pod with no visible traces of red pigment. Natural pollinators are thus able to pollinate white flowers. A native bee has been observed pollinating *D. punctatum* in the Grampians, Victoria (Bernhardt and Burns-Balogh 1983). The small number of white flowering spikes does not allow comparison of pollination of white and pink forms. Most pink flowers of *D. punctatum* develop mature seed capsules. The second white flowering spike flowered very late in March and did not produce a capsule.

Comment

White colour forms of Victorian *D. punctatum* may have been sighted in other areas, and not reported. The author welcomes correspondence on *alba* and other unusual colour forms of *Dipodium.* The term *alba* is often inappropriately used to describe pale-coloured or white-flowered forms with a yellow labellum or other colour blotches. True *alba* forms have no colour on the floral parts except for the yellow of pollinia.

Continued page 172

Microtis

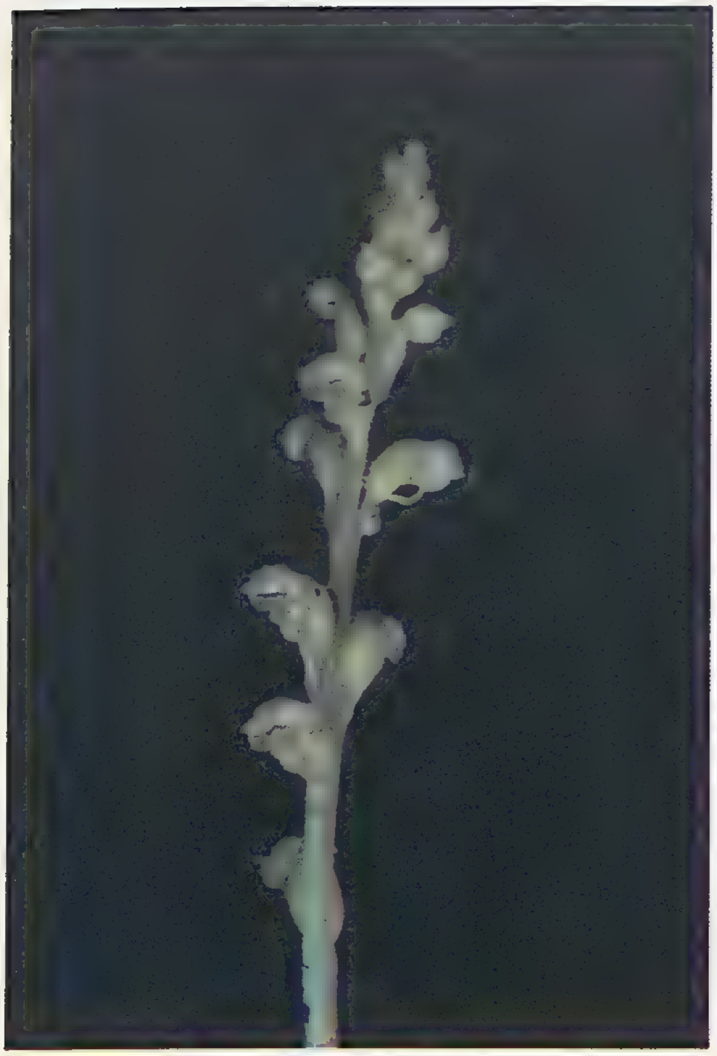


Fig. 1. *Microtis globula.* A recently named species from south Western Australia.

Photographed by R. Bates.

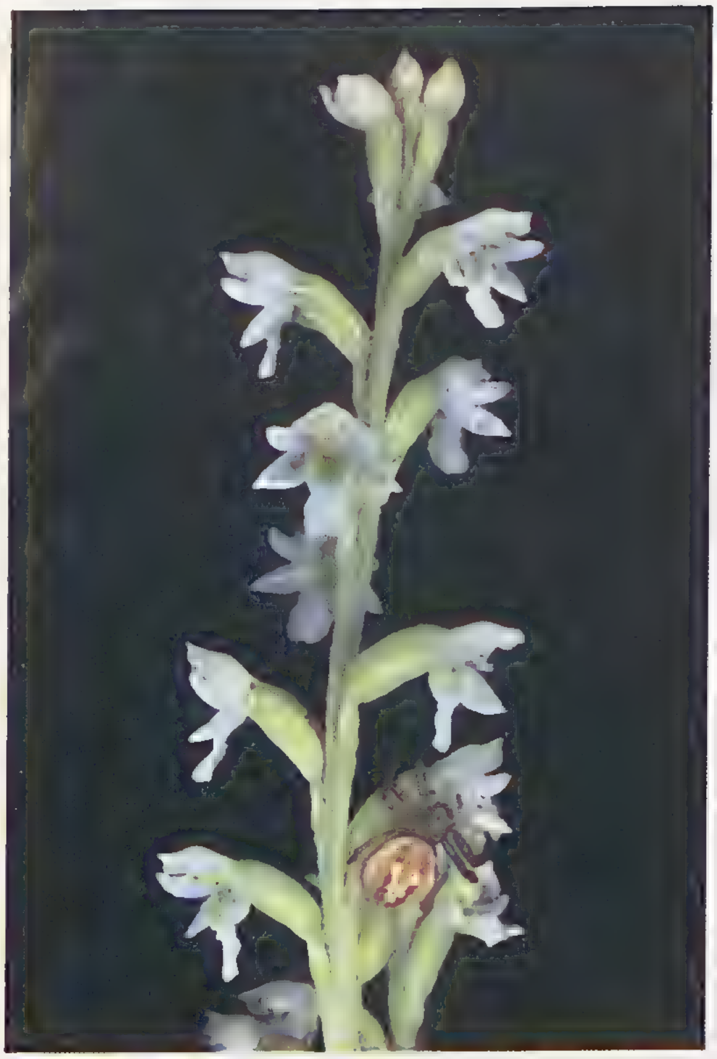


Fig. 2. *Microtis pulchella,* a rare species from Walpole, Western Australia.

Photographed by R. Bates.

Dendrobium speciosum

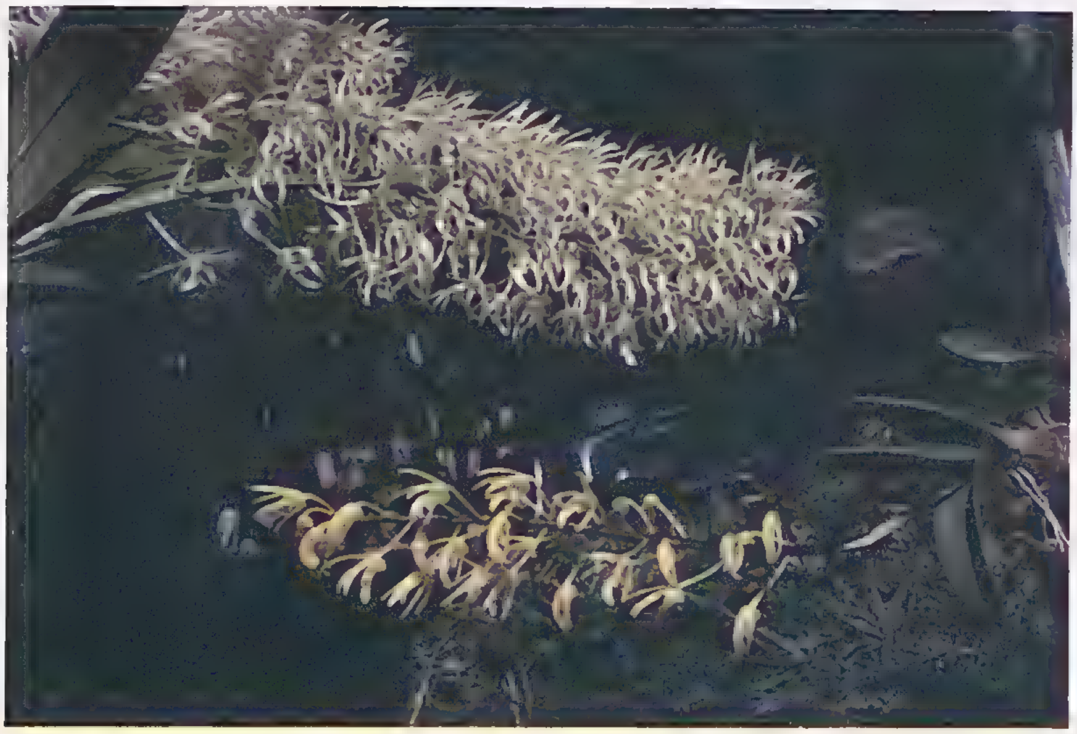


Fig. 3. Two varieties of *Dendrobium speciosum*, var. *hillii* at the top with var. *speciosum* at the bottom.

Photographed by S. Clemesha.

Dipodium punctatum

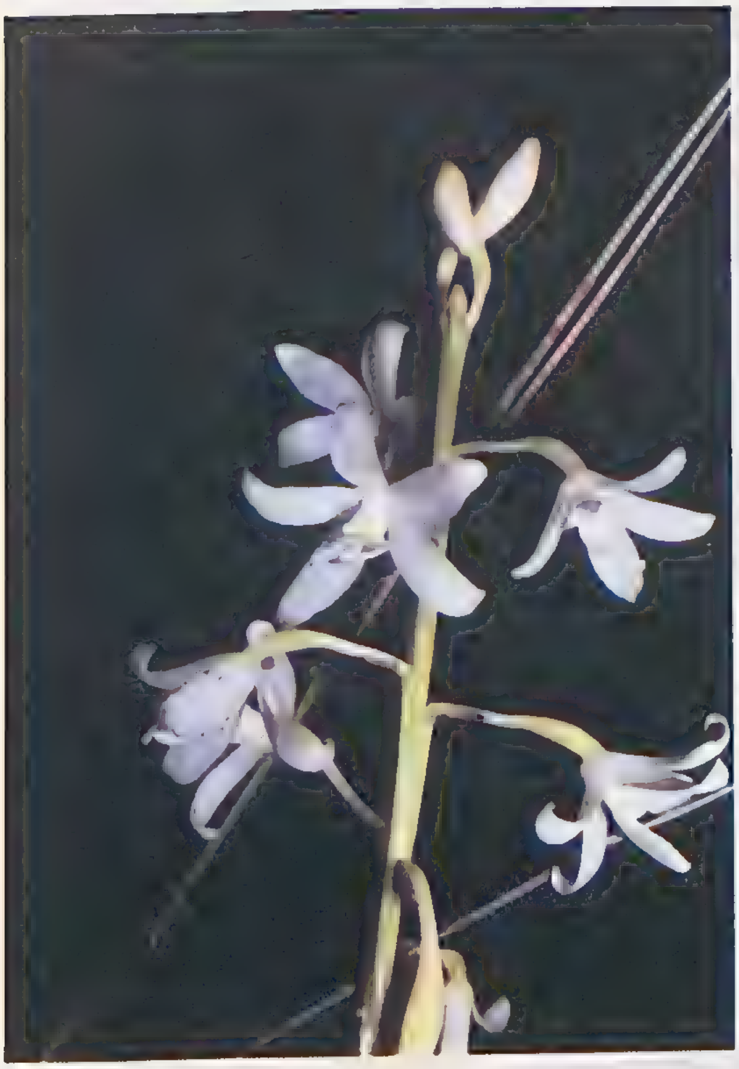


Fig. 4. *Dipodium punctatum*, alba form.

Photographed by P.B. Adams.

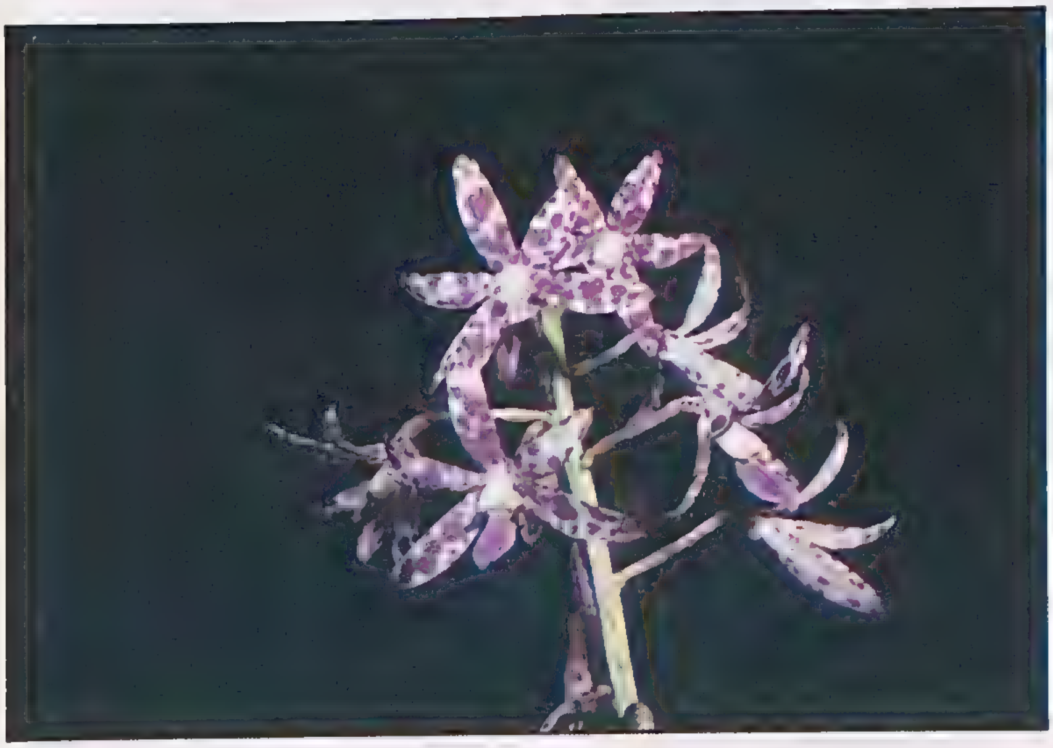


Fig. 5. *Dipodium punctatum*, pink spotted form commonly seen in East Gippsland, Victoria.

Photographed by P.B. Adams.

Several other common Australian orchids display a colour range from pure white to dark pink or red; for example, *Dendrobium kingianum, Caladenia catenata, Sarcochilus ceciliae* and *Sarcochilus fitzgeraldii.* The frequency of finding *alba* forms in *D. punctatum* appears to be much lower than in these orchids. The genetics of colour inheritance in the white-red range is not yet understood. Colour inheritance is almost certainly controlled by a number of genes. Breeding experiments selfing white colour forms indicate the complexity of the system — white X white usually produces a range of pink flowering progeny and only a small number of *alba* flowering plants.

Acknowledgements

The assistance of Ken Morrison, National Parks Service, Department of Conservation, Forests and Lands, and Mrs. Lee Coke of Mallacoota, is gratefully acknowledged.

References

Bernhardt P. and Burns-Balogh P. (1983) Victorian Naturalist Vol. 100 No. 5 Pp. 197-9

Clements M.A. (1979) The Orchadian Vol. 6 No. 4 Pp. 75-77.

Jones D.L. and Logan A.E. (1971) The Orchadian Vol. 4 No. 1 Pp. 2-6.

Botany School
University of Melbourne
Grattan St., Parkville
Victoria 3052.

Received, May 1986

Letter to the Editors

Dear Editors,

May I congratulate you on the high standard you are maintaining in *The Orchadian* — especially in the latest issue (December, 1985). Of course I should prefer to see 24 pages rather than 20.

My own article (pp 133-134) on Editorial Policy, however, needs a few words of explanation immediately so that your discerning readers will not be left with the impression that the writer has finally sunk into senility.

On reading it now, 12 months after it was written, I was quite pleased with it — until I came to the second paragraph on p. 134, which begins "During my editorship ..... " This paragraph appears quite irrelevant, as it stands, to the theme of my argument. It seems to have no purpose other than to "blow my own trumpet" and that of *The Orchadian!* (Kindly readers could alleviate my shame and improve the article by applying "liquid paper" to that paragraph as well as to the footnote "*The emphases (italics) are mine — J.J.B").

These two flaws in my paper can be explained away, as you well know, by the ever present "editorial problem". In fact both flaws were caused by the simple editorial act of deleting about 250 words (half a column) to make the article finish on p. 134! What can be done after the event? As Omar Khayyam would say: "The Moving Finger writes: and, having writ, Moves on: nor all thy Piety nor Wit shall lure it back to cancel half a Line, Nor all thy Tears wash out a Word of it". More concisely: "What's done cannot be undone".

As you can see, I like to quote from writers who can say it better than I can. And that is what I did in the deleted quotations from Eric Hagsater, the distinguished editor of *Orquidea (Mex.)* See issue for May, 1984, pp 243-4). Hagsater said "when I asked Carl Withner why he had rushed into publication with his series of articles on the Encyclias of Mexico, which contained so many mistakes, he replied that he thought he had good reason. If enthusiasts and professional taxonomists had a revision to study they soon would be led to make corrections ..... " otherwise "we would go on using old and even less correct concepts". Then Hagsater goes on to say "In fact, Withner's publication did speed up the work of Dressler and Pollard".

Nevertheless Withner's criterion is accepted by Hagsater as a "partial truth" only; and he contrasts it with that of "*the too many perfectionist botanists who want to have all possible data before publishing".* This is where I applied my emphasis — making the footnote* necessary in my article) ..... "We have to attempt to find a balance between waiting for an unobtainable perfection and publishing immediately papers whose data have hardly been checked at all". (p 244)

I believe nothing could be more relevant to editorial policy than these words from Hagsater. They should be writ large on the Editor's desk and he should find space for them in *The Orchadian.*

Yours sincerely,

J.J. Betts,
44 Memorial Avenue,
St. Ives

Editors' comment: We apologise for the inadvertent inclusion of the paragraph and the footnote referred to above by Mr. Betts; 'there is many a slip twixt pen and press' as editors well know.

The editing out of 250 words was felt necessary; the article was accepted on the basis of running to two pages only. We believe we preserved the essence of Mr. Betts' argument and in editing his article, exercised an editorial prerogative we feel certain Mr. Betts would be the first to defend.

Dendrobium speciosum — An Update

by S.C. Clemesha

Since the publication of my *D. speciosum* papers in 1981 and 1982 I have noticed an increase in interest in it and some orchid growers are trying to obtain plants of the varieties of it that they do not have. Some native hybridists are including crossings and selfings from good clones in their lists.

I have been asked to draw up a table comparing the 6 varieties as some have difficulty sorting these out from the descriptions. I also am including notes on other matters.

D. speciosum var. *hillii* at Peat's Ridge

Mr. Ian Slade of Peat's Ridge sent me an excellent example of *D. speciosum* var. *hillii* that he collected from a large Moreton Bay Fig dislodged in basalt quarrying operations. He reported that there had been a pocket of rainforest on a relatively small basalt area and the orchid flora of it was different to that in the surrounding sandstone country.

D. speciosum var *hillii* had been plentiful throughout it as was *D. gracilicaule* and *D.* x *gracillimum* was once fairly plentiful there too. The form of *Sarcochilus falcatus* that grew there was larger and later flowering than that which grows in the sandstone country. Ian also stated that *Sarcochilus ceciliae* was reported to him to have grown on a basalt ridge long since destroyed by quarrying.

Regretably the area had been almost completely destroyed by quarrying and Ian expected the last small fraction of it to be covered with loose stone within a short time and so a unique area was lost.

Ian also sent me a raceme of *D. speciosum* var. *speciosum* from the sandstone close to the basalt area. The examples of the two varieties were as clearcut and distinct as any examples of them from anywhere within their ranges. I sent specimens of the two varieties and also of *D.* x *gracillimum* to the N.S.W. National Herbarium.

I also have a plant of var. *hillii* from the Wattagan area that Norm Stockton gave to me. He also gave me a small plant from the Minnamurra area that was rescued from a near dead clump that had fallen from high in a tree. This plant has now flowered and is typical of *D. speciosum* var. *speciosum*.

D. x gracillimum

I have observed that the situation at Peats Ridge where plants of *D.* x *gracillimum* were confined to the area where var. *hillii* grew is true of the hybrid generally. No natural hybrids between var. *speciosum* and *D. gracilicaule* are known though they once grew close enough together and in sufficient numbers to reasonably expect them.

Throughout the range of *D. speciosum* var. *grandiflorum, D. gracilicaule* is plentiful and I know of some areas where they grow together. Natural hybrids between these as far as I know are unknown though they are reported from north Queensland between *D. speciosum* var. *curvicaule* and *D. gracilicaule.* I have not seen any examples of the hybrid from there but the few north Queensland plants of *D. gracilicaule* that I have seen have thicker canes than south Qld. and N.S.W. plants so there is a possibility that the northern plants may not be hybrids at all. They are reported from the Mackay — Eungella area and from near Proserpine.

Illus. 1. *Dendrobium speciosum* var. *speciosum*. Kangaroo Valley.

A short-growing race of var. *hillii*

I have seen plants of *D. speciosum* from east of Tenterfield and in the adjacent part of Queensland which have stems about 30cm tall which resemble those of var. *speciosum* except they are not as thick at the base. I have seen flowers of these plants. They are identical to

THE TABLE OF DIFFERENCES

	var. *speciosum*	var. *hillii*	var. *grandiflorum*
Pseudobulbs	Commonly 50cm or less tall, thickest at the base and tapering upwards.	Commonly up to 1m tall, tapering little from base to apex.	Mostly like var. *hillii* but when tapered taller than in var. *speciosum.*
Leaves	Usually large in proportion to the pseudobulb and often about as long as it.	Variable but often thinner in texture and narrower in width than in other varieties.	Like var. *hillii* though often thicker in texture. Leaves on tapered pseudobulb plants are proportionly smaller than in var. *speciosum.*
Peduncle (Basal part of raceme that has no flowers.)	Short.	Short.	Short.
Flowers	White to yellow, more widely spaced than in other varieties.	Mostly white but sometimes cream or yellow in strong sunlight. Flowers more crowded and numerous than in any other variety. Flowers smaller and more slender than those of other varieties.	Flowers cream or yellow, white forms unknown. Flowers large.
Lower Sepals	Often broadest at base and tapering to a narrower rather blunt apex. Mostly over 2.5cm long.	Sepals tapering slightly or not at all and usually 2.5cm or less long.	Often incurved and tapering little or not at all. 3-5cm or more long.
Seed Capsules	Green.	Green and often more slender than in other varieties.	Green.
General	A medium size plant with tapered pseudobulbs, fairly large leaves, and spaced flowers.	A large plant with untapered pseudobulbs and racemes of very numerous crowded, narrow segmented flowers.	A large plant with untapered or slightly tapered pseudobulbs and large yellow flowers with incurved untapered lower sepals.

THE TABLE OF DIFFERENCES, Continued

var. *capricornicum*	var. *curvicaule*	var. *pedunculatum*
Only slightly tapered if at all and 15cm tall or less.	Habit variable. Some are fairly slender and thickest at the base. Commonly it is broadest at the middle and tapered at both ends, more flattened than in other varieties and from 12cm to about 1m tall but mostly 30-50cm tall.	15cm or less tall, thickest at the base and tapering to a much narrower apex. Often dark reddish in colour.
Small in proportion to the pseudobulb and hard in texture.	Variable but tend to be broader for their length than those of other varieties.	Proportionately small thick or thin in texture but very hard, and more erect than in other varieties.
Making up about half to one third the length of the raceme in the winter flowering type form but short in the inland form.	Making up about one third the length of the raceme.	Making up half to two thirds of the raceme.
Flowers white and opening in early to mid winter in type form and yellow and spring flowering in the inland forms.	Flowers mostly white except near Mackay where cream. Opening more widely than in southern varieties.	White or cream sometimes opening with a pink tinge in very heavily pigmented forms. This soon fades.
Shorter than in the more southern varieties and tapered. About 2cm long.	Short broad and blunt and tapering little if at all.	Like those of var. *curvicaule* but often shorter and broader still.
Green in inland forms, unknown in type form but probably green.	Usually green but sometimes with light brown markings.	Deep shining purple.
Small plant with long racemes of yellow spring flowers or white winter flowers.	A medium to large plant with rather flattened pseudobulbs which are broadest at the middle and flowers with short broad segments like those of *D.* x *gracillimum.*	A dwarf plant with small hard leaves. The whole plant is often more pigmented than other varieties. Racemes upright peduncle long, flowers with short, broad segments and deep purple seed capsules.

those of var. *hillii* but are much more widely spaced. It is a poor form horticulturally and I expect its reduced size and number of flowers is the result of a colder, drier habitat than is usual for var. *hillii*.

Illus. 2. *Dendrobium speciosum* var. *hillii*

D. speciosum var. *grandiflorum*

Good examples of this variety are the finest of the species but like all orchids there are good, bad and middling forms of it from a horticultural point of view. Fortunately good forms of it are fairly widespread and numerous but they do seem absent from some areas.

I have 5 clones of var. *grandiflorum* from the Kenilworth area. One has flowered 3 times and each time it has been in winter i.e. late May to July. Racemes have had only about 20 flowers. My other clones from the same locality all flower normally in Spring.

Intermediates between varieties

Prior to the publication of my papers it was believed generally by many that the varieties of *D. speciosum* merged gradually into each other to such an extent that they could not be satisfactorily differentiated. I think this belief was based on an assumption as no proper overall study of the species had been made. I have found no examples of varieties crossing in the wild though possibly they did in past ages when rainfall was greater or less than it is now.

The Bulahdelah area is the northern most known for var. *speciosum*. I have observed that flowers on racemes of plants from there are more numerous than on plants from further south. This could be the result of plants having some var. *hillii* in their ancestry but no plants of it grow near the var. *speciosum* plants now. In all other respects the plants at Bulahdelah are typical of var. *speciosum* and the flowers still are much less numerous than in var. *hillii*.

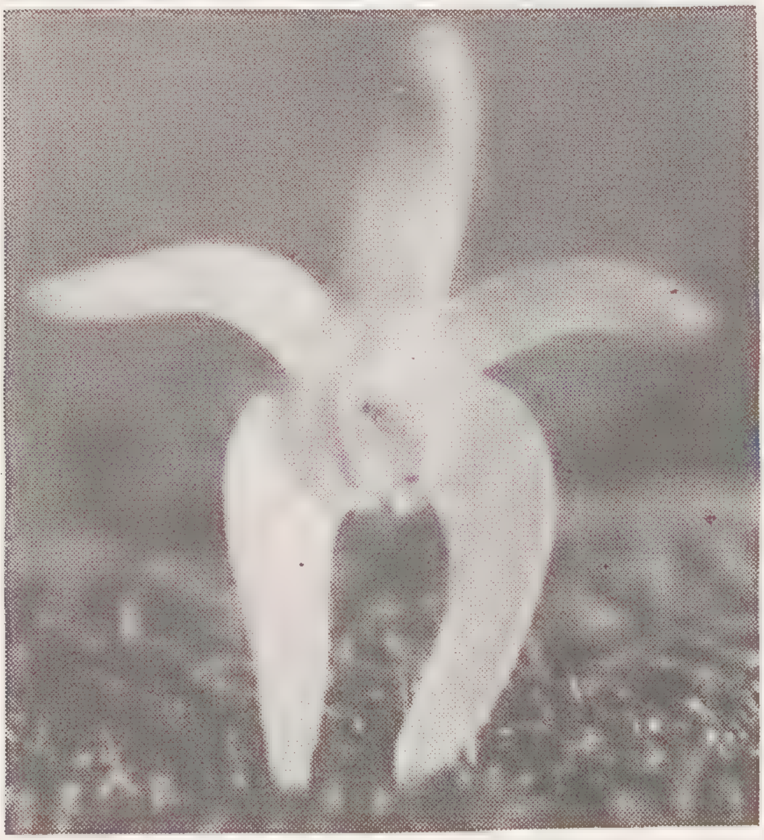
The situation with var. *capricornicum* is interesting. The habitat of this variety is a series of isolated ranges and volcanic plugs separated by wide areas of dry flatter country. The populations of the plant therefore are isolated from each other.

Illus. 3. *Dendrobium speciosum* var. *grandiflorum*

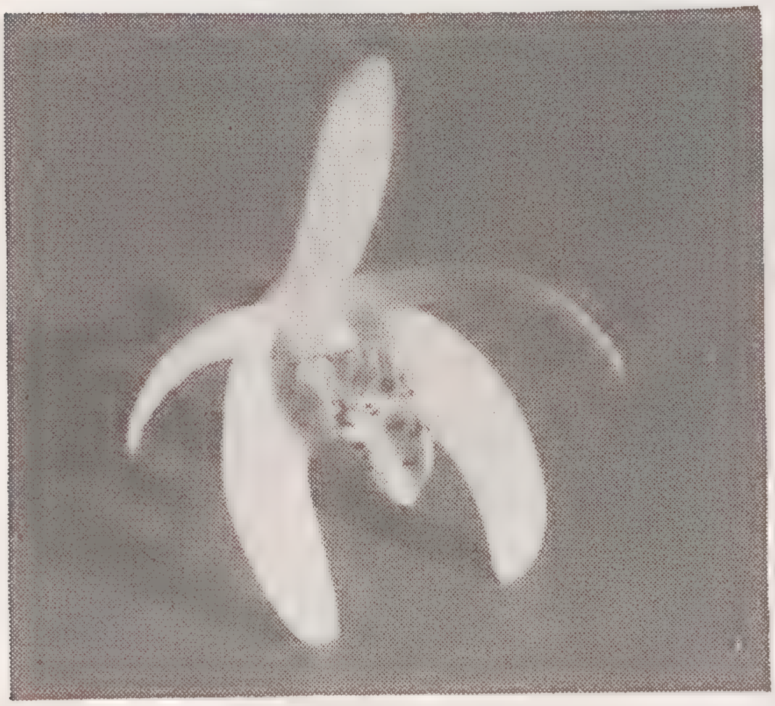
The clone I have seen from the Carnarvon Gorge area has flowers like var. *grandiflorum* but the segments are shorter and broader. Those I have seen from the Blackdown Tableland resemble it but have sepals which are short, broad and tapered like those of the type form of var. *capricornicum*. These two inland populations are spring flowering. Racemes are arching and more than twice as long as the pseudobulbs. They are an attractive yellow shade.

The range of the type form of this variety starts over 100km east of the Blackdown Tableland. Its foliage is paler than that of the inland plants and its fairly upright racemes have white flowers on a fairly long peduncle. The flowers open in June or early July and have finished weeks before the normal season for flowering starts.

The inland populations are intermediate between the type form of var. *capricornicum* and var. *grandiflorum* in some respects but all are geographically isolated from each other and the type form of var. *capricornicum* is isolated by its different flowering season as well.



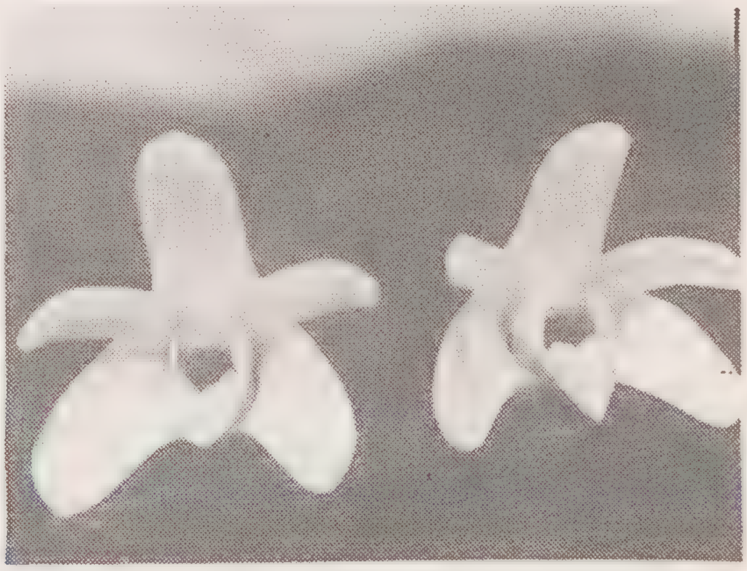
Illus. 4. *Dendrobium speciosum* var. *capricornicum* Blackdown Tableland



Illus. 5. *Dendrobium speciosum* var. *curvicaule*

D. speciosum var. pedunculatum

It has been reported as only producing one raceme per pseudobulb. This commonly is the case but very robust examples will produce two. The same pseudobulb will flower a second year in a minority of cases.



Illus. 6. *Dendrobium speciosum* var. *pedunculatum*. Two clones are shown; the type being on the right and one from Herberton on the left.

Cultivation

D. speciosum can survive drought and full sun if adapted to it gradually. It can be killed by fire, freezing and bad drainage especially if regularly watered. The two dwarf varieties are from areas with a long dry season. They will grow well in high rainfall areas provided drainage is excellent and they get good air movement. If a plant of *D. speciosum* will not flower the general cause is not enough light. Under my conditions most plants will flower under 50% shade cloth provided they get no shade from other sources eg. over crowding. Plants of var. *curvicaule* from the Eungella Range near Mackay and all my plants of var. *capricornicum* will not flower unless given full sun for part of the day.

Footnote

Since writing this article I have been informed by David Banks that natural plants of *D.* x *gracillimum* have been found that have *D. speciosum* var. *speciosum* and *D. speciosum* var. *grandiflorum* as their *D. speciosum* parents. I only know of one clone of each and I have not seen the plants.

Letter to the Editors

Dear Editors,

J.J. Betts article "Editorial Policy — Some Reflections" published in the December, 1985 issue of The Orchadian contains errors.

J.J. Betts stated my findings were never confirmed or denied in print. This is not so. The Australian Orchid Review Vol. 46, No. 3. p.173 (Sept. 1981) in "Where to in Hybridising *Dendrobium speciosum* by its experienced and respected editor, Mr. Ronald Kerr, followed my treatment and described it as "an outstanding review of the species". Soon after this was published Betts wrote to me advising me of it.

P.S. Lavarack and B. Gray followed my treatment of *D. bigibbum* in their "Tropical Orchids of Australia". They also include the two tropical varieties of *D. speciosum* and follow my reductions of *D. speciosum* var. *nitidum* and *D. speciosum* var. *bancroftianum* to synonyms. They omit *D. speciosum* var. *capricornicum* This very distinctive variety only just reaches the southern extremity of the area they deal with.

The author and original reference they give for *D.* x *gracillimum* is illegitimate. The correct reference is *D.* x *gracillimum* (Rupp) Leaney, in Orchid Zeyl. 1:73, 74 (1934).

D. speciosum x *D. ruppianum* is treated by them as a natural hybrid that has not been named. This is followed in "The Australian Native Orchid Hybrid Guide" compiled and edited by John Kavulak. This hybrid was described as *D.* x *ruppiosum* S. Clemesha in The Orchadian June, 1982, 91-92.

I sent an abbreviated version of *D. bigibbum* article to The American Orchid Society Bulletin. It was published — Vol. 49, 9, 991 — 994 (Sept. 1980) and one leading American author will follow it in print.

Betts stated that of the six *D. speciosum* that I accept "3 were determined by Bailey". This is not correct, only 2 were — *var. grandiflorum* and *var. curvicaule.* The third, var. *hillii* was validly described by Masters.

It is very important that errors of this type be avoided as they are likely to be repeated. This already has happened with the name *D.* x *ruppiosum* being overlooked.

S. Clemesha
Lot 6, Skinner Close,
Avocada Heights,
Woolgoolga 2456.

Dendrobium cucumerinum

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Sarcochilus australis
Drawing by A. Dockrill (adapted).

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AUSTRALASIAN NATIVE ORCHID SOCIETY

Statement of Receipts and Payments for year ended 30 June, 1985

Receipts	1985/86 $	1984/85 $
Membership Subscriptions	7,142.23	4,500.82
Bank Interest	278.06	261.87
Sale of Badges	22.00	15.50
Sale of Orchadian — Back Issues	692.65	596.37
Sale of Hybrid Check Lists	902.43	19.00
Advertisements in Orchadian	534.00	421.50
Miscellaneous	1,544.79	97.21
Sale of Medals	443.00	313.00
Sale of Index	45.00	40.00
Subscriptions 1985-1986 in Advance	-	1,458.98
Donations to Colour Fund	994.00	587.25
Donations	301.00	23.00
Publications	-	49.00
21st Workshop	-	1,618.26
	12,899.16	10,001.76
Cash at Bank 1.7.85	651.08	4,466.26
	13,550.24	14,468.02

Payments	1985/86 $	1984/85 $
Orchadian Printing, Postage, etc.	7,109.54	8,281.92
Secretarial — B. & C.	526.84	2,053.68
Secretarial Advance	200.00	100.00
Miscellaneous Expenses		
Duty Stamps	10.00	10.00
Postage A.N.O.S.	525.39	246.84
A.N.O.S. Secretarial	572.00	-
Affiliation A.O.C. + O.S. of N.S.W.	57.00	-
Post Office Box Hire	48.00	44.00
Hybrid List	-	500.00
Bank Charges	21.51	18.37
Badges and Medals	618.18	408.00
Photography	-	11.45
Printing (Envelopes, Letters, etc.)	928.78	-
21st Work Shop	-	638.90
Dishonoured Cheque	14.00	38.50
Registration of Publication	36.00	30.00
Index (Consolidated)	798.20	949.00
Advertisements in "Your Garden"	97.80	149.10
Stationery	8.70	41.01
Sundries	720.59	296.17
	12,292.53	13,816.94
Cash at Bank 30.6.86	1,257.71	651.08
	13,550.24	14,468.02

In addition to the above, the Society has an Interest Bearing Term Deposit with Westpac Banking Corporation of $1,500.00.

E. HUSTED . Hon. Treasurer.

AUDITOR'S REPORT

In my opinion the above Statement of Receipts and Payments for the year ended 30th June, 1986 is properly drawn up and is in accordance with the books of account of the Society, and gives a true and fair view of the cash position at 30th June, 1986.

Sydney, 4th August, 1986

N. PILBEAM, A.A.S.A., C.P.A. Honorary Auditor.

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The Genus *Pterostylis* in Australia and New Zealand

by L. Cady

Part 1.

Introduction.

The genus *Pterostylis* is a variable and in many cases confused grouping of plants. This series will attempt to discuss and illustrate the presently accepted state of the genus.

The author is aware that changes will occur in the near future in a number of groups within the genus and agree that it is sorely needed — particularly in the "summer flowering" Rufous and *barbata-plumosa* complexes. As this series looks like extending to about 18 parts, much of this revision is hoped to be included as it occurs. From the author's own investigations, he is aware of at least 15 undescribed or distinct variations which will not go into any now accepted species and this number is probably underestimated.

History

The genus was described by Robert Brown, the father of Australian Orchidology, in his book Prodromus Florae Novae Hollandieae et Insulae van Dieman in 1810 with *P. curta* as the genus holotype. The following species were described in the original treatment of the genus, *P. acuminata, P. concinna, P. curta, P. cucullata, P. dubia, P. gibbosa, P. grandiflora, P. longifolia, P. mutica, P. nutans, P. nana, P. obtusa, P. ophioglossa, P. parviflora, P. pedunculata, P. rufa, P. revoluta, P. reflexa* and *P. squamata*.

The earliest printed recording of *Pterostylis* appears to be by a French botanist, Jacques Julien Houton de la Billardiere as *Disperis alata* in his Novae Hollandiae Plantarum Specimen (pl 2.59, T.210 (1806)) in 1806 and was subsequently placed into *Pterostylis* by H.G. Reichenbach in 1871.

Distribution

Pterostylis is a true Australian genus as it appears to have had its origin in the legendary southern Gondwanaland. The genus has then migrated north to the Australian mainland through Tasmania, west to Western Australia, south east to New Zealand (where the genus has evolved another section not found on mainland Australia, this is known as the "Australis" group), north west to New Caledonia and still further north to Niuguini where the most northern recording appears to be the island of Ceram. It seems strange that the genus has not been found on the islands north of Niuguini, perhaps it has been overlooked! The most southern recording appears to be Stewart Island.

Cultivation

This genus on a whole amends itself well to pot growing, although there are some species that are difficult, usually because of their specific habitat in nature, but as experience is gained even these are usually able to be grown with minimal losses.

Compost

There are a number of mixes that the plants seem happy to grow in. I use two slightly different mixes.

Mix No. 1 for colony types.

This group usually grow in more leaf mould than in the "Rufous" group. ⅓ leaf mould, ⅓ course river sand, ⅓ mixture of small pebbles and find charcoal.

Mix No. 2 for "Rufous" and low rainfall area types.

Half part coarse river sand, ¼ part humus or leaf mould, ¼ part mixture small pebbles and fine charcoal.

In both mixes quantities can be varied to suit the area you live in.

Watering

All species of *Pterostylis* are deciduous, surviving as a tuber in the dormant period, which in most, is in the summer. During this dormant period the plants require little water, in fact I usually leave it to the rain. The drier region growers require a dry rest and are better placed under cover where watering can be controlled.

With the late summer and autumn flowerers, start to water the pots just prior to Christmas, sparingly at first then gradually increasing as the flowers or rosettes appear. Plants should then be kept moist, **never wet,** while they are in active growth, then as the plants finish flowering, water should be gradually reduced until the plants start to wither. Once the autumn flowerers start to appear most others will have begun their growth period and start to show above ground, these can now be treated as for the summer flowering types. There is a *Pterostylis* in flower almost every day of the year somewhere in Australia.

I grow most of my plants in 6″ (150mm) squat pots either in terracotta or plastic, as the type of plant warrants.

Pests and Diseases

Pterostylis do not seem to have too many ailments and of these probably the most persistent is Red Spider. This can occur at any time but is more frequently found very early in the season and usually when conditions are drier. The leaves of the plant take on a silvery appearance and appear to be scalded. Red Spider or Spider Mite is a microscopic mite and only the effect of the mite can normally be seen with the naked eye. Control is usually effected with Malathion or Kelthane used as directed; frequent misting of the foliage with water also helps in dry times.

Mealy Bug is at times encountered. This can occur either under the leaves or on the roots in the soil. This pest looks like small dobs of fairy floss with an insect within. Control can be had with Pyrethrin used as directed or by dabbing the insect with neat Methylated Spirits. They are persistent and a second treatment will be needed about 4 weeks later, as eggs laid by the adults will hatch in about this period.

Snails and slugs take a huge toll of these "succulent" plants, and can be controlled with one of the available snail baits, making sure not to let the pellets lodge in the leaves as they will burn them badly, often causing the loss of the plants.

Rotting of the tubers is often a problem, particularly in the dormant period. I leave mine dry and only let the rain do the job (see Watering). The problem is usually caused by too much water in some way, either the compost is holding too much water, or the plants are potted on too large a pot.

Do not use fungicides on *Pterostylis* as they grow in association with ground fungi and at present little has been published on this subject. Much more work needs to be done before one could recommend a fungicide, as killing the fungi could kill the plants also.

Fertilizing

If a good mix is used and plants repotted yearly one should not need overhead fertilizers, but a mild dose of any organic type fertilizer at ⅓ strength at 2 weekly intervals, especially if the plants have been in the pots for more than one season is useful.

The addition of one of the slow release type fertilizers would also be useful. I feel though that too much additional fertilizers will only produce leaf growth at the expense of flowers.

Growing from Seed *

For the amateur grower of orchids, the raising of plants from seed can really be quite a chore; most of us do not have the requirements to do flasking, and the cost of getting it done by professionals is a cost not warranted unless the plants required are very rare or of special interest. Quite a few seedlings can be raised, however, by simply sowing the ripe seed on the top of an established pot of your collection. Some preparation however, will improve the "strike".

Use a layer of chopped up *Casuarina* needles or Radiata Pine needles sprinkled finely on top of the selected pot (the pot must contain a live orchid to supply the required fungus to assist with the germination of the seed. Terracotta pots seem to give better results. The pots need to be placed in a 50% to 70% shade area and be kept constantly moist. The longer the seedlings are kept growing in their first year the larger the tuber they make. A first year tuber is only the size of a pin head or at best a match head, so it follows one does not repot until the tubers are sizable enough to handle, in 2 to 3 years. Some species will flower in about 18 months from seed but generally 3 to 5 years is normal.

Seed when collected should be stored in paper envelopes in a cool situation and sown in April to May for best results.

Watering is critical for if you fill the pot to overflowing you will float off your seed. The best method is by bottom watering or with a very fine spray from a distance.

Habitat Notes

The genus *Pterostylis* has a wide range of habitats and can be found growing from the sea side behind the sand dunes, in swampy areas, open heath lands, open *Eucalyptus* forests into the gullies then upwards to the mountain sides and mountain top, over the dividing ranges to the drier inland areas where they are found well into the 12″ (350mm) per annum rainfall area.

It is only to be expected that the plants are subject to numerous variations to growing conditions. Plants of the sea side are usually found in very sandy soil under or on the edge of *Leptospermums* or in the immediate *Eucalyptus* forest area under the low fern cover, this area is generally damp in the winter and dry to very dry in the summer period. Plants of the *Eucalyptus* forest areas fare similarly. In the gully regions the conditions become moister and species like *P. nutans* var. *hispidula*, *P. hildae* and *P. pulchella* can be found in or on the edge of the rain forest (the requirement of a rain forest is that it receives at least 66″ (1800mm) of rain per annum. *P. pulchella* is found growing on wet banks or in the moss on cliff faces and rocks, normally in wet or very damp conditions but this species adapts to much drier conditions in culture, in fact it does not like wet feet at all. Most of these gully types will tolerate drier conditions in culture than they would experience in nature, **so beware of over watering.** As we move to the mountain tops we find a few types grow in open heathlands, e.g. *P. daintreana, P. aphylla* and the *P. parviflora* complex. They grow usually in poor stony soil, on the margins of swamps. The soil is often covered with moss or caked with a thick cover of lichen. This area is usually damp in the winter and very dry in the summer.

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*Reference: for an excellent article on seed raising, see this journal Vol. V. Page 58 by Les Nesbitt.

The swamp fringe is the home of *P. furcata*, usually in sphagnum moss and on the edges of creeks; also growing in sphagnum moss we find *Pt. dubia.* These wetter growers are generally found in the alpine regions in N.S.W. and the southern areas growing in or on the edges of sphagnum bogs. These areas can often by subject to flooding during the very wet times. I find *P. furcata* grows well in the above No. 1. mix, but I top it with live sphagnum moss to indicate the moisture content of the pot. It is also kept in a small amount of water in a saucer, but never wet. I grow these species with my carnivorous plants.

The species from the western slopes and drier inland areas are typified by *P. revoluta, P. nana* and *P. truncata* from the colony section, while *P. rufa, P. biseta* and *P. boormanii* are typical of the "Rufous" group.

Before I visited these inland areas I was of the opinion that these plants grew in arid conditions and tended to treat the species of the inland as "succulent" plants, i.e. very harshly, but recently we had a trip to record and photograph some of these inland plants and my ideas were changed considerably. From my observations in a normal season the inland region is considerably different to the coast, which must have continual or frequent showers of rain to keep it damp. Inland however, once the late summer or autumn rain falls, the soil stays damp right through the growing period of the *Pterostylis,* only starting to dry out as the "Rufous" group finish maturing their growth in the late winter or early spring, hence the withering of the basal rosette in many of this group. Observations of the plants of the same species found in semi-shaded areas show they retain their rosette much longer than the plants found in the more exposed positions. It follows that the conditions of the basal rosette in this group is not a reliable character for separating a species. I have also noted changes in shape and colour in some of the "Rufous" types (*P. rufa* subsp. *aciculiformis*) from immature plants to their full maturity. Much more work must be done on the life cycles of plants. Little has been published, as yet, on their pollinators, the fungal associations and structural variations.

In the inland region one must look for the remnants of the original flora, found usually (and thankfully) in many of the nature reserves of those areas. It appears that much of the *Pterostylis* flora found in the drier inland usually occurs on rocky outcrops.

From soil tests taken of soil from the habitats of a number of coastal and inalnd sites, it was found that the PH varied from 4.5 for plants of *P. biseta* growing in rich leaf mould to a "norm" of 6 for most other tests conducted.

The ability of the "Rufous" group to blend into the landscape is uncanny and one is often hard pressed to locate them in an area where they are known to occur in good numbers.

Notes on Nomenclature as used in this paper.

In the initial treatment of the genus, Robert Brown subdivided it into 4 sections. Sect. I in which the plants had rosettes at the base of the flowering stem, the labellum appendage penicilate. Sec.II rosette separate to the flowering stem, the flowering stem with cauline leaves, labellum appendage penicilate. Sect. III labellum appendage not divided. Sect. IV in which he singled out *P. dubia.*

Benthum and Hooker next divided the genus into two major sections i.e. *Antennaea* and *Catochilus,* which basically relates to the positioning of the lateral sepals.

Rupp in 1933 divided the genus by using the forms of labella i.e. *Laminatae,* in which the labellum is entire, *Filiformae,* in which the labellum is beset with hairs; subsections were then divided according to the leaves of the groups.

In this paper the author has used positioning of the lateral sepals combined with the types of labellum appendage as the major Sections, then subdivided the groups according to the leaf presentation with further divisions as to the length of the caudae of the lateral sepals.

There are two other groups that, in my opinion, do not fall easily into their allotted position and could at some later review be set as sections, i.e. the New Zealand "Australis" group and the Western Australian *P. recurva.*

In the "Australis" group, the extremely long cauline leaves (after the form of *P. longifolia* but with single flowers) combined with only one flower per plant sets it aside from all other groups, while in *P. recurva* the positioning of the flower, the length of the lateral sepals, the multiple flowers and the unusual labellum again segregates this species as one of a kind.

Key to the Sections of the Genus *Pterostylis*

Section 1. *ANTENNAEA.* Flower with inferior lip of perianth (i.e. connate lateral sepals) erect, concave, its lobes or caudae embracing the galea (hood). Labellum appendage laciniate.

- **a.** Plants with rosette at the base of the flowering stem, stem bracts scale like. Lateral sepals connate and embracing the galea or extending above the galea. Labellum entire its appendage laciniate.
  - *i.* Flowers over 2cm high usually 1 rarely more. *P. scabrida, P. baptistii, P. curta* (in some forms) *P. stricta, P.* X *ingens, P. nutans* var. *P. nutans, P.* X *furcillata.*
  - *ii.* Flowers under 2cm high usually 1 rarely more. *P. pedunculata, P. hildae, P. concinna, P.* X *toveyana*, P. ophioglossa* also subsp. *fusca, P. acuminata, P. allantoidea, P.* X *conoglossa,. curta* (in most forms), *P. erecta, P. nana, P. depauperata, P. nutans* var. *hispidula P. pedoglossa.*
- **b.** Plants with flowering stems separate to juvenile rosettes. Stem bracts leafy; cauline (the stumps of the flowering stems can form rosettes from below ground after flowering but this group rarely has more than 1 flower).
  - *i.* Flowers over 2cm, usually 1 rarely more. *P. revoluta, P. coccinea, P. cucullata, P. grandiflora, P. fischii, P. scabra* var. *robusta, P. recurva**, P. pulchella, P. laxa, P. aestiva, P. truncata, P. areolata, P. humilis, P. micromega, P. alobula* (at times).
  - *ii.* Flowers under 2cm usually 1 rarely more. *P. obtusa, P. reflexa, P. tenuissima, P. dilatata, P. longicurva, P.* X *toveyana*, P. russellii, P. alobula* generally, *P. brumalis, P. humilis, P. irsoniana* generally, *P. venosa, P. abrupta, P. angusta, P. alata, P. scabra* var. *scabra, P. decurva.*
- **c.** Juvenile rosettes separate, flowers emerging from a basal rosette of leafy growth, appendage of labellum laciniate. *P. furcata, P. dubia, P. foliata.*
- **d.** Juvenile rosettes separate to flowering stem, lateral sepals connate embracing the galea, labellum appendage laciniate. Flowering stems with large leafy bracts. Flowers 1 rarely more. (Known as the "Australis" group. Found only in New Zealand and **not** occurring in the Australian mainland.) i.e. *P. australis, P. montana,* its variety *rubricaulis, P. oliverii, P. areolata, P. banksii,* its variety *patens, P. graminea.*
- **e.** Flower stem with no basal rosette at flowering time, rosette separate but attached to flowering stem below ground level, juvenile rosettes separate. Labellum entire, appendage laciniate. Lateral sepals embracing the galea, multiflowered. i.e. *P. aphylla, P. parviflora* complex.

Section 2. *CATOCHILUS.* with inferior lip of perianth, patent from base or reflexed or recurved from the middle. Labellum entire or with cilia or setae, appendage obtuse or obsolete.

- **f.** Flowering stem with no basal rosette at flowering, rosette separate but attached to flowering stem below ground level, juvenile rosettes separate. Labellum entire, appendage solid. Multiflowered. i.e. *P. daintreana.*
- **g.** Rosette at base of flowering stem. Flower emerging from the centre of the rosette. Labellum entire or margins with setae, appendage solid. Lateral sepals deflexed. Flowering stems with scale like bracts. Usually multiflowered.
  - *i.* Lateral sepals not extended into a caudae. i.e. *P. mutica-cycnocephala* complex.
  - *ii.* Lateral sepals extending into a caudae, but under .05cm long. i.e. *P. rufa* subsp. *rufa, P. gibbosa.*
  - *iii.* Lateral sepals caudae over .05cm but under 1cm. i.e. *P. rufa* subsp. *aciculiformis, P. boormanii, P. setifera, P. hamata, P. pusilla, P. mitchellii.*
  - *iv.* Lateral sepals caudae over 1cm long. i.e. *P. biseta, P. woollsii.*
- **h.** Juvenile rosettes separate to flowering stems. Lateral sepals deflexed, not extending into long caudae. Labellum appendage solid. Flowering stem with leafy stem bracts. Multiflowered. i.e. *P. longifolia, P. vittata* its variety *subdifformis, P. sargentii.*

Section 3. *FILIFORMAE.* Lateral sepals deflexed; base of the labellum glabrous, its lamina beset with long hairs almost to the prominent gland at its apex.

i. Flower stem with a basal rosette or the rosette elongating up the flowering stem. Labellum very narrow with long hair on the lamina. i.e.*Pt. barbata-plumosa* complex.

* *P. X toveyana* in some forms do show a part rosette while other forms show no rosette at all.

** *P. recurva* this plant is an anomaly in this section and possibly should have a section to itself for has a very distinct flower, unlike any other species in the genus and can have up to 3 flowers.

List of species presently accepted for Australia.
Pterostylis

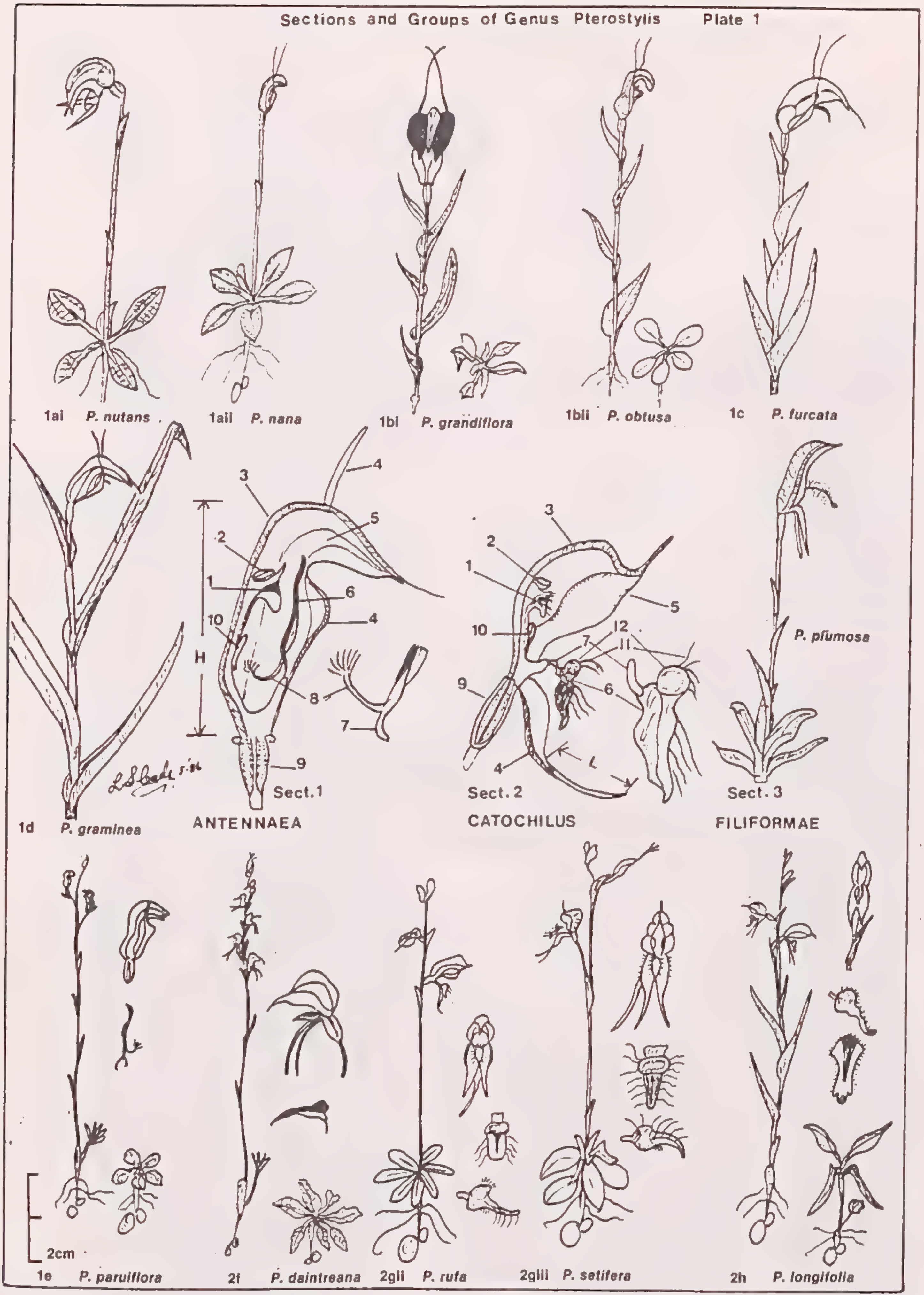
acuminata R.Br.
abrupta D.Jones
aestiva D.Jones
alata (Labill.) H.G.Reich.
allantoidea R. Rogers
angusta A.S.George
aphylla Lindley
baptistii Fitzg.
barbata Lindley
biseta Blackmore et Clemesha
boormanii Rupp
depauperata Bailey
coccinea Fitzg.
concinna R.Br.
X *congolossa* Upton
cucullata R.Br.
curta R.Br.
cycnocephala Fitzg.
daintreana F.Muell.
decurva R.Rogers
dubia R.Br.
dilatata A.S.George
erecta Hunt
fischii Nicholls
foliata J.D.Hook.
furcata Lindley
X *furcillata* Rupp
gibbosa R.Br.
grandiflora R.Br.
hamata Blackmore et Clemesha
hildae Nicholls
X *ingens* (Rupp) D.Jones
laxa Blackmore
longicurva Rupp
longifolia R.Br.
longipetala Rupp
mitchellii Lindley
mutica R.Br.
nana R.Br.
nutans R.Br. var. *nutans*
nutans R.Br. var. *hispidula* (Fitzg.) Moore et Betche
obtusa R.Br.
ophioglossa R.Br. subsp. *ophioglossa*
ophioglossa R.Br. subsp. *fusca* Clemesha
parviflora R.Br.
pedoglossa Fitzg.
pedunculata R.Br.
plumosa Cady
pusilla R. Rogers
pulchella Messmer
recurva Benth.
reflexa R.Br.
revoluta R.Br.
rogersii E. Coalman
rufa R.Br. subsp. *rufa*
rufa R.Br. subsp. *aciculiformis* (Nicholls) Blackmore et Clemesha
russellii T.Hunt
sargentii C.R.P. Andrews
scabra Lindley var. *scabra*
scabra Lindley var. *robusta* (R. Rogers) A.S.George
scabrida Lindley
setifera Clements et Matthias et Jones
stricta Clemesha et B.Gray
tenuissima Nicholls
X *toveyana* Ewart et Sharman
truncata R.Br.
vittata Lindley var. *vittata*
vittata Lindlev var. *subdifformis* Nicholls
woollsii Fitzg.

List of species presently accepted for New Zealand
Pterostylis

alobula (Hatch) L.B.Moore
areolata Petrie
australis Hook.f
banksii A.Cunn. var *banksii*
banksii A.Cunn. var *patens* (Col.) Hatch
brumalis L.B.Moore
cycnocephala Fitzg.
foliata Hook.f
graminea Hook.f var. *graminea*
graminea Hook.f var. *rubricaulis* *H.B. Mathews ex Cheesem.*
humilis R.Rogers
irsoniana Hatch
micromega Hook.f
*montana*Hatch
mutica R.Br.
nana R.Br.
nutans R.Br. var. *nutans*
oliveri Petrie
plumosa Cady
trullifolia Hook.f
venosa Col.

Three unnamed species are also mentioned in Native Orchids of New Zealand by Johns and Molloy.

Sections and Groups of Genus Pterostylis Plate 1



1 Column wings
2 Anther cap and pollina
3 Dorsal sepals
4 Lateral sepals
5 Petal
6 Labellum
7 Labellum hinge
8 Labellum appendage 'laciniate' type
9 Ovary
10 Stigma
11 Labellum setae
12 Labellum appendage 'obtuse' type

H Height as quoted in Key
L Length of caudae as quoted in Key

Australian Native Dendrobiums — from Flask to Flowering

by Sid Batchelor

Choosing Your Flask

In choosing a flask of Australian Native Dendrobiums a number of points need to be taken into consideration. Firstly, in regard to the physical aspect of the plants in the flask, a most important factor is that the plants are still growing strongly at the time of deflasking; any plants which have stopped growing, usually because they have exhausted the nutrients in their growing media, are difficult to get going again once they have been deflasked. At best, considerable time is lost in the plants becoming established, and in the long term this could very easily result in them taking an extra season before they flower, and when all is said and done, flowering them is the name of the game.

The plants in flask, nearing deflasking, should have a good balance of leaf growth as compared to root growth. Generally speaking the roots should have just about completely covered the bottom of the flask. Leaf growth will vary according to the species or hybrid in the flask. Very pale green or yellowish leaf growth is usually an indication that the nutrients in the flask have been exhausted or that the flasking media is deficient in one or other of the substances that it should contain.

Whether the flask contains species or hybrids, the same type of questions need to be asked as to the quality and suitability of the parent stock for breeding. In the wild, nature arranges the pollination of plants so that the overwhelming majority of seedlings are siblings rather than selfings, as there are definite advantages in this type of breeding which gives a better spread of the genes within the species and avoids the possibility of breeding in and fixing the poorer qualities in the flower which is selfed. It goes without saying that only the very best of stock should be considered for breeding, and even when these super plants are available, a lot of thought and weighing-up of possibilities should be indulged in before actually making the cross. Some plants have a history of breeding behind them and we can refer to this to ascertain their various dominant and recessive features, others we may be breeding with for the first time, and here it is important to consider where each of its parents have shown dominant and recessive characteristics in the past, and from this, together with all our other information and experience, make an educated assessment as to whether the mating is likely to produce the result we are seeking. No hybrid should be made without due consideration to a number of factors which are critical to the result in every instance. In my opinion the most important of these are:—

1. Plant size ... Preferably compact and tidy.
2. Spike habit ... Clear of the foliage and upright or semi-arching, as distinct from drooping.
3. Floriferousness and flowering period ... We should be aiming for an abundance of flowers over an extended period.
4. Lasting qualities ... Flowers of good substance and texture will naturally outlast thin and papery flowers, so good heavy substance has high priority.
5. Ease of Culture ... It is important that we try to avoid hybridising with parent stock which is itself difficult to grow. This trait will almost assuredly be passed on to the progeny.
6. Colour ... Should be clean and bright, any markings must be well defined — not smudgy or blurred.
7. Size and Shape ... In our Native Dendrobiums we have an infinite variety of size and shape of flower. I feel very strongly that we should be making a conscious effort to retain them all in our breeding programmes. By all means improve the size and shape where that is possible without losing the individual character of the flower. Do not place too much emphasis on 'round and flat'. After all we are not breeding magnolias.

Before you purchase your flask consider all of these factors, discuss them with your supplier. You will learn a little more about the plants you are purchasing and their prospects for success. Only buy flasks that you are satisfied contain plants with a fair chance of producing the type and colour you require. With every flask you take a chance, but by a critical assessment of what you are acquiring, along the lines set

Continued page 192

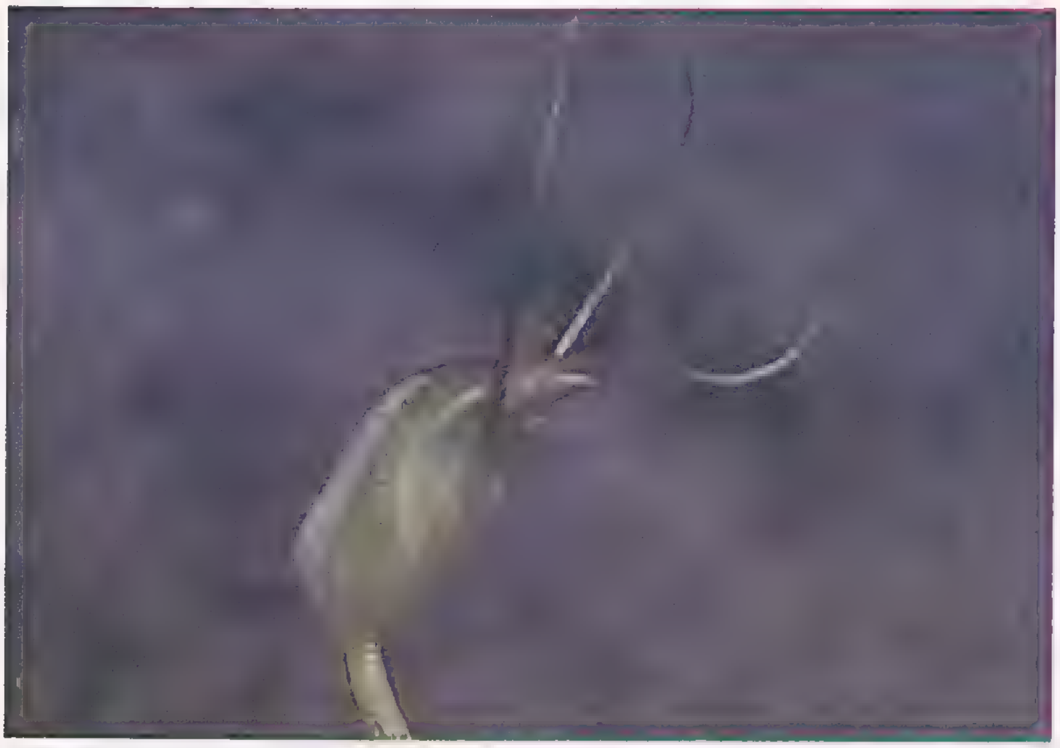


Fig. 1. *Pterostylis pedoglossa.* Photographed by Leo Cady

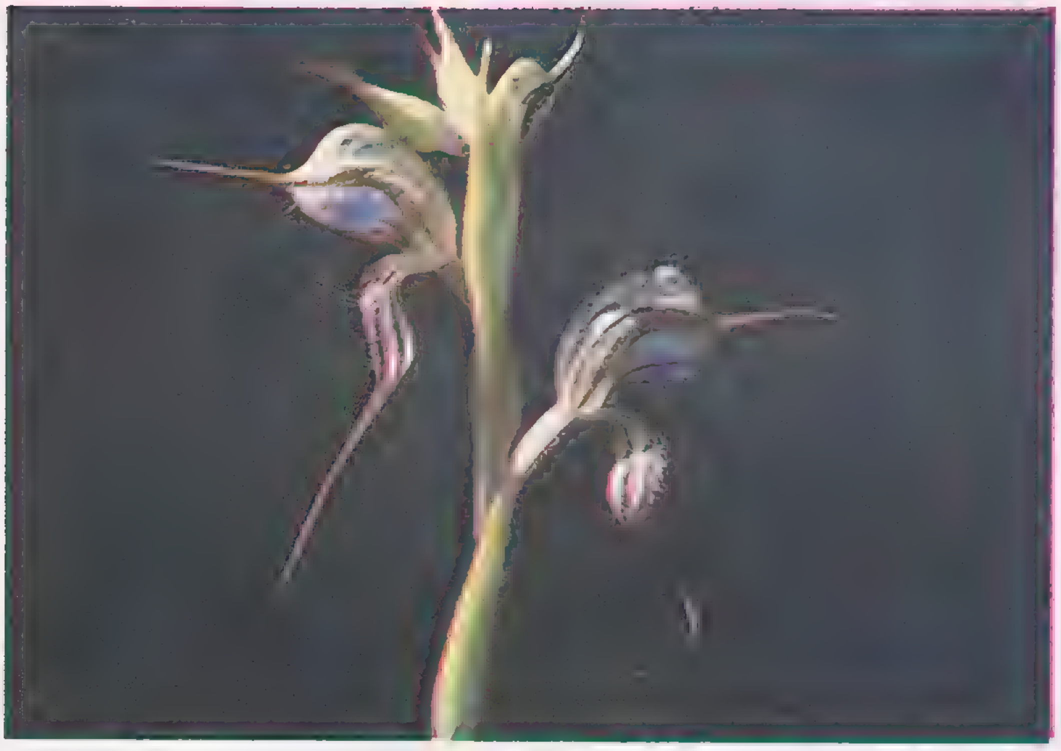


Fig. 2. *Pterostylis biseta.* Photographed by Leo Cady

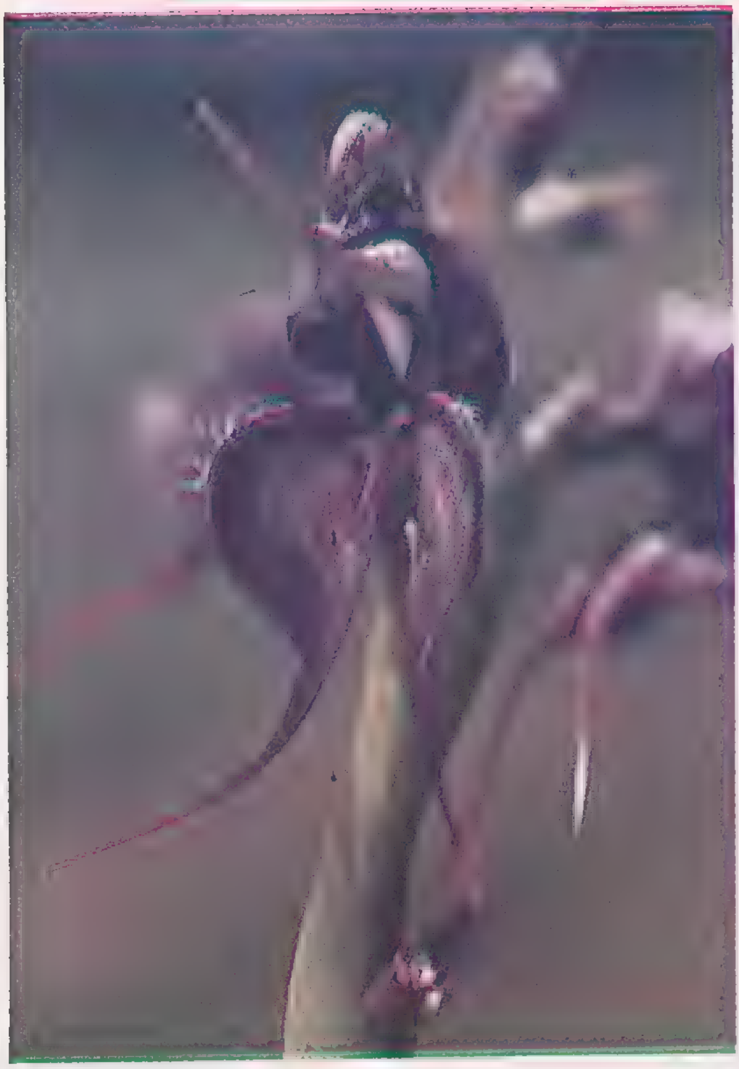


Fig. 3. *Pterostylis boormanii.*

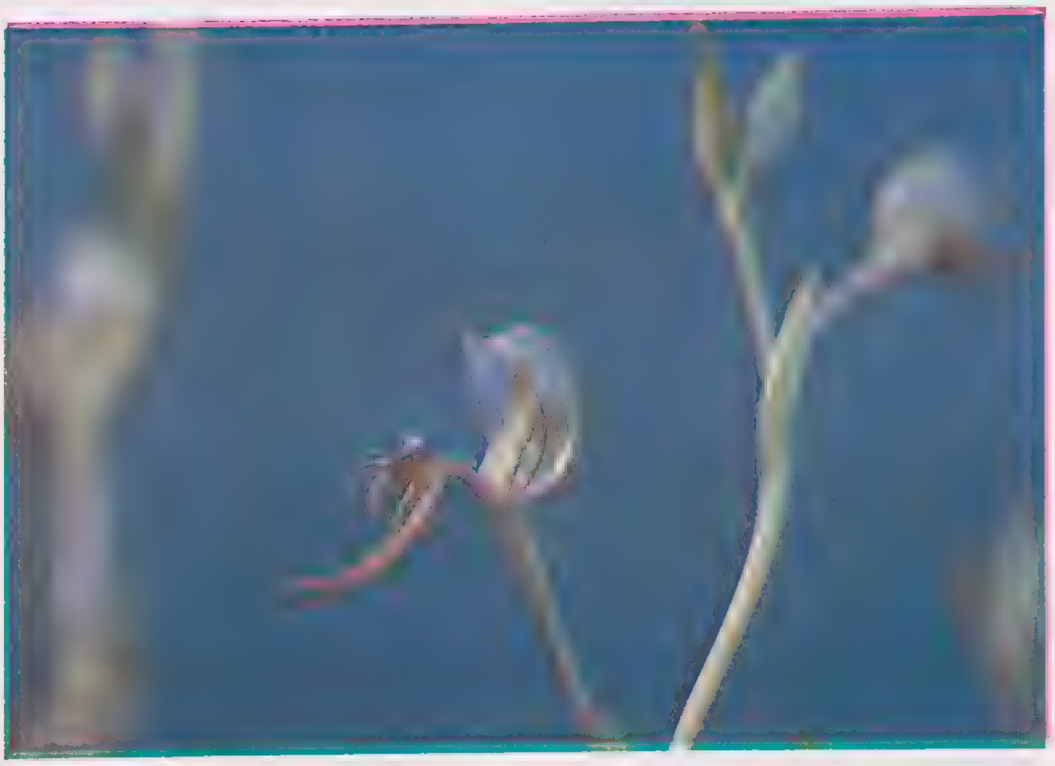


Fig. 4. *Pterostylis setifera.*

Photographed by Leo Cady

out above, you must improve your chances of success.

Deflasking

The best time to acquire flasks is in early spring so that when they are deflasked they have a full growing season ahead of them. Before deflasking, the plants in flask should be allowed to stand in an area of moderate light, preferably in a glass house or other protected area for about two weeks (about 70% shade is ideal) to harden up in preparation for the somewhat more difficult growing conditions ahead of them.

Some types of flasks have to be broken in order to remove the plants. It is sometimes recommended that the flask should be wrapped in newspaper and smashed, the idea being that the newspaper protects the person doing the smashing, this may be so, but it does little for the plants inside the bottle! I prefer to mark around the outside of the bottle or flask etc. with a good glass-cutter. A gentle tap on the marked line breaks it neatly in two and the plants can be lifted out without harm. I prefer straight sided bottles or flasks; then all that is necessary is to take off the cap and hook out the plants, media and all, with a piece of wire, and place them on paper on the workbench for separation. As my plants are separated I wash each one individually in a solution of two litres of tepid water to which has been added one teaspoon of Captan or other suitable fungicide and six drops of Formula 20. After washing, the plants are placed on a piece of paper towel which holds enough of the solution from the washed plants to keep them in good condition until all have been processed. I then select the largest of the plants and plant them individually in 50mm tubes. I usually replate sufficient flasks to enable me to discard the really small plants; however if these are required they can be potted up into a community pot (about 15-20 plants to a 150mm pot). In either case they are planted in a mix of eight parts each of seedling size pine bark and similar size river gravel and one part each of seedling grade charcoal and horticultural perlite from which the dust has been removed. For a number of years I used a mix of equal parts of bark and gravel with quite good results, however since I have added the charcoal and perlite to the mix, improvement has been apparent and I shall certainly continue with the new mix. As each twenty or so plants are potted up I move them to their growing area in the shadehouse under 70% shade and water them with a mixture of one heaped teaspoon of Captan or other suitable fungicide and six drops of Formula 20 to ten litres of water. If the weather permits (not too hot) they are then left for two or three days before normal watering. They are then treated in the same manner as all other natives in the shadehouse, that is, water as required. I water quite frequently, but this depends on each individual grower, and every grower seems to have his or her own idea on the subject. All my plants, including the babies are fed 'Johnsons Formula' weekly and for me they thrive. There is no reason why they should not do the same for you.

I am convinced that one of the most important factors in growing our Native Dendrobiums well is the environment in which they are grown. Just as you create a specific environment in a glass-house in respect to light, humidity, temperature, etc., you can create optimum conditions in your shadehouse that will give you that feeling of bouyancy so often quoted by our scribes, ... particularly in describing glasshouse conditions which they describe as feeling 'right'. The basic requirements of a shadehouse are well known. I like a roof a little over two metre high, benches about half a metre above ground level, made of galvanised pipe and mesh to give full air circulation, they also tend to deter pests like slugs and snails. The southern wall should be closed in with fibro cement or similar material to keep out the cold/wet conditions which cme from that quarter. The western wall should be closed in with glass, alsynite, or other translucent material to block out the seasonal westerly winds, and to take advantage of the much needed afternoon light in autumn and winter. Some portion, preferably the south-west corner should be roofed over with glass or alsynite to provide a protected corner for those plants which need controlled watering in winter, and as protection for those plants being groomed for shows etc. Having at least two areas of different shade value is a distinct advantage. I would suggest 50% shade for the main growing/flowering area and 70% shade for smaller plants just out of flask and up to near flowering size. Sarcochilus also prefer the 70% zone.

The foregoing suggestions for a shade house are only **basic requirements.** These need to be worked on, as dictated by the position of your shadehouse and every other factor such as shade from neighbouring properties etc. Try to achieve that elusive 'atmosphere' that your plants will enjoy; you know the feeling, like walking into a shaded dampish gully or creek area, the air somehow feels different, not dank and cold but moist and just a little cooler than elsewhere. There is just a hint of air movement;

it feels good, it will feel that way to your plants too and they will respond accordingly. To achieve these conditions one of the first areas to receive your critical attention will be the floor; not just the area between the benches, but wall to wall, preferably before the benches are constructed. If the floor is hard earth and slopes even moderately, water from watering, misting, etc. will be lost almost immediately. If necessary form a series of flat areas and shape your benches to suit the area; they do not all have to be squares and rectangles, the more you break them up the more interesting the area becomes. The important part, or one of the important parts is what is under the benches. After levelling the floor I fill with about 300mm (6 inches) of boiler ash and wait for this to settle before constructing the benches. Now if you wish to maintain some peace in the home, cover the ashes with 25 to 50mm of small blue metal or gravel — this stops the black from the ashes walking up onto the new carpet, but more importantly it allows the moisture held in the ashes to permeate through the gravel into your growing area, a good soaking of the floor will maintain conditions of good humidity for days, even in summer time.

There are other factors governing environment, but in the main they are small adjustments involving individual shadehouses and you will pick them up as you go along. The main thing is that you are now looking for ways of achieving that 'perfect environment'. Small changes can make big differences.

Culture

The actual culture of your plants is a very individual matter, growers have varied ideas about growing media, pot sizes, feeding, etc. If your method is working for you — do not change it, at least do not change it until you have tested the proposed change on a few plants for at least a full season — then evaluate critically and honestly before you commit your whole collection to change.

For many years my collection, from babies up, grew in a mix of 50% pine bark and 50% gravel with very good results. Over the past couple of seasons I have experimented with a mix containing 40% pine bark, 40% gravel, 10% charcoal and 10% perlite (charcoal and perlite seived to remove dust). I have been sufficiently impressed by the new mix over the past two seasons so that I am now prepared to move my whole collection into it as I repot, with one exception — for any plants that I expect to remain in the same container and mix for **more** than three seasons I delete the charcoal, because after this period, if you are feeding with chemical fertilisers, as I am, the charcoal becomes toxic to the plants through absorbtion of chemical salts and results in root loss.

I prescribe wholeheartedly to Mr Alvin Bryants' article on 'Magic Water'. In this article he propounds the theory that credit is given to a lot of new fertilising programmes, when in actual fact much of the credit is due to the more regular and efficient watering programme coincidental to the feeding programme. In other words if you plants are contained in a suitable growing media, grown in a suitable environment, and receive sufficient water at correct intervals, they will grow surprisingly well without additional feeding. However I feed all of my plants from community pots and 50mm size, right up to flowering size with the 'Johnson Formula', as published in the Australian Orchid Review. I feed once a week and like to water at least twice between feedings. Sufficient water at regular intervals, so that the plants are never stressed by the need for water is of paramount importance in any feeding programme. If plants which have been fed with chemical fertilisers are allowed to dry out completely they are at risk of damage by reverse osmosis. With the right combination of environment, water and nutrition you will flower your plants at close to their full potential, but neglect any one of these facets and their potential will never be realised.

Pests

The pests which attack our Australian Native Dendrobiums are many and varied, however with regular and careful shadehouse and glasshouse hygiene, removal of dead leaves and tissues, weeding and generally keeping the area clean and tidy, most of the pests can be dealt with without resorting to the more toxic sprays on the market to-day. I regularly visit one very good collection where regular (3 or 4 times per year) sprays of a Lime Sulphur compound, readily available at any nursery, appears to afford almost complete control of pests. **Red Spider** is a pest which is often not treated until the infestation is well established. There are specific sprays for red spider (miticide), or very good control can be established by biological means with predatory mites ... **Wax Scale** is readily controlled by some of the less toxic insecticides in conjunction with a small percentage of White Oil ... **Dendrobium Beetle** seems to be more of a pest in collections which are in close proximity to areas of wild growing orchids. They also thrive in neglected collections. Control is difficult, but can be established with systemic insecticides.

while in the larval stage. However for the eggs to reach larval stage a great deal of damage has been done, for when the eggs hatch they burrow into the new growth on which they were laid and turn the growth into a rotting, unsightly mess. Constant vigilance and good hygiene is the best control for this pest ... **Grubs and Chewing Things** are relatively easy to control if you are observant and prepared to spray several times a year as a preventative measure ... **Aphids** are probably the worst pest of all in nuisance value. You never see them unless you have flowers almost ready for a show or club meeting. They mass on the flower spike, puncturing the flowers and buds and in many instances causing the buds to abort. They will also attack succulent new growths causing marking and pitting of the soft tissue. They have also been mentioned as possible vectors of orchid virus. Some pyrethrum based sprays can be used without damage to the open flowers, however they should not be used in the heat of the day otherwise the flowers will be severely marked and may even drop. Some of the newer granular systemic insecticides which are sprinkled on the surface of the growing media and watered in, claim success, however if the aphids are already on the flower spikes it is too late for this type of treatment. It would, however, seem to be an ideal form of preventative treatment for those special plants being groomed for shows, etc., particularly if the treatment was commenced as soon as the flower spikes initiated.

Flowering

If you have been fortunate, or zealous enough to have missed out on, or controlled all the nasties mentioned in the preceding chapter you will have flowers in pristine condition for exhibition, provided that you have carefully tended your plant since the flower spikes first became noticeable. Make sure that none of the spikes get caught under leaves and become twisted. As the spikes begin to extend the plant should be removed to a sheltered situation to avoid dust and water damage. All watering should now be to the growing media only, and not over the whole plant. Daily inspection is necessary at this stage as aphids and their relatives can sneak in overnight.

It is possible to speed up flowering slightly by placing plants in brighter, warmer (or both) conditions. If your plant is in full flower, it will last longer in good condition if kept in darker, cooler conditions.

Anyone can grow and flower Australian Native Dendrobiums. The end result will depend entirely on the amount of time, effort and vigilance that you are prepared to expend in following this most satisfying of horticultural pursuits.

2 Woodlands St.
Baulkham Hills, NSW 2153.

Hoya in Australia

By D.J. Liddle & P.I. Forster

Containing two sections:

1. Preliminary observations on *Hoya* and *Dischida* (*Asclepiadaceae*) in Australia, by D.J. Liddle.
2. *Hoya* cultivation in southern Queensland by P.I. Forster.

This work, an interim paper, lists all known Australian species, and many as yet, unnamed species collected over a period of six years by D.J. Liddle. All species are illustrated with line drawings and are fully described in botanical english, without assigning status or names. Cultivation for the tropics and south-eastern Queensland is discussed and maps showing collection localities are included.

Foolscap. 39pp, cost $4.00 plus postage.
Available from D.J. & J.M. Liddle,
P.O. Box 794, Mareeba. 4880
North Queensland, Australa.
Phone (070) 93 3176

Cultivating *Dendrobium lasianthera* in Queensland

by M. Purnell

***Dendrobium lasianthera* is one of Papua New Guinea's most handsome dendrobium species, and its natural habitat is the steamy swamp lands of the Sepik River and its tributaries.**

I have collected it only in the Ymas and May River areas, but it is reported to inhabit a great many areas along the mighty Sepik. Fortunately, the area is not the easiest place for orchid collectors to penetrate, and for that reason I hope it remains just as difficult to get at, for many years to come, and avoids being decimated as are too many of the world's orchid habitats.

At Ymas, the majority of plants collected bore big handsome flowers with lavenders and purples the predominant colours; all have vivid purple labellums. Most have erect petals with up to four crisp twists, pale creamy white at the base, darkening to purple brown and red brown at the tips, often with a thin orange-yellow or green-yellow edge. Lateral sepals are undulated, pale at the base, darkening to tan brown at the ends which are turned under mainly, with creamy yellow edges. Some sepals are held stiffly horizontal; others downward and back. The dorsal sepal is often erect, with two crisp twists; the tips of all sepals are pointed, pale in colour, often green-yellow. The lip and side lobes are richly suffused with purple and heavily veined rich purple; side lobes are wide spread and flared. Each bloom is up to 7cm tall, and almost as wide, glossy and heavy textured, with 15 to 25 flowers on an inflorescence approximately 40cm long. Many clones have less flowers, though one exceptional plant I collected from the May River area and which I have dubbed 'var. chartreuse', has two spikes each 65cm long bearing 32 and 35 flowers with finer thinner petals, erect with 4½ crisp twists.

Lasiantheras have a very wide variation in colours and size and no two of the hundreds we saw in each area were identical. In Ymas, and very much more so in the May River area, many flowers were suffused with orange yellow, and as *D. conanthum* occurs in the same area, I suspect it may have cross-pollinated with *D. lasianthera* over countless years to produce the colour combinations.

In the May River collections, the flowers were robust, with a glossy sheen in countless colour combinations of red-brown, purple-brown, orange-red, bronze-purples, blues and rich dark purples, all with lovely dark purple labellums, a positive feast of colour. Most sepals and petals were edged in yellow and had a red-purple glow, extremely hard to describe, and to resist.

I never did get into the real forest area where clones are reported growing on tall forest trees. The whole area was in flood, and it is extremely difficult to squat in a hollowed cut log canoe and be poled along water channels in the swamp grass, by locals who handle their dugouts with nonchalant ease. The lasiantheras grew on Nauclea trees on humps in the grassy swamp, rather scraggly open-branched smallish trees with the plants firmly attached by an extensive root system, and because of the length of both roots and canes, somewhat difficult to collect. We tried to collect only smallish plants with good well shaped flowers of the most desirable colours; many were only 30-50cm tall and bearing one to two spikes of flowers.

Their natural habitat is hot and very steamy with an annual rainfall of over 6000mm, often a good deal more, with temperatures stable at about 30°C all year. It grows on trees with its upper canes and blooms in the sun, and its lower canes and roots in shaded dappled sunlight, with ample afternoon and night rain giving constant moisture, humidity and perfect drainage.

In Mackay the temperature can range from sudden cold snaps to 3°C in Winter, and to 40°C in Summer. Generally Summer temperature ranges from 32°-36°C, Winter 8° - 12°C but a wide fluctuation is possible. Rainfall is averaged at 1500mm per year, but varies from 500mm to 2500mm with prolonged dry windy conditions in summer and cold wet and windy in winter. Autumn gives long periods of grey days with drizzly rain and no sun for weeks, so jungle plants have a wide range of climatic conditions to adjust to. Lasiantheras flower here from January to May; in the Sepik almost all year round. I have found the clones I brought back suffered badly from fumigation on entry; at least 60% died in Quarantine and half the rest in the next six months. The survivors took two years to even resemble their former selves; often the sick plants attempted to put forth up to ten flower spikes in a final desperate effort to propagate themselves. Unfortunately, I have never seen lasianthera throw an aerial growth in the wild or in captivity. After fumigation, they attempted to throw a forward lead, but these died back, and a second eye further up the cane shot, only to die back also. Eyes on older canes seemed to be mostly eaten out by insects in the bush, and it was most disheartening to see those hard-won plants die, despite the greatest care lavished on them. Nevertheless, I grew on enough to develop into strong healthy plants; some are now two metres or more tall, which dismays people after they have admired the gorgeous flowers.

I have selfed all my clones and find the seedlings acclimatise better than the imported clones, and have made some handsome hybrids with many colour forms of *lasianthera.*

Den. Alan Mann (Caesar x *lasianthera*) is a superb clone with huge heavy-textured white flowers 9cm tall and 8cm wide, with vivid purple tips on both sepals and petals, the labellum richly shaded and veined in purple, with 13 to 15 flowers on each spike.

Den Constance (*discolor* x *lasianthera*) is big robust and handsome and ranges from pinks to dark red-purples while *Den.* Claudia (*helix* x *lasianthera*) also has big and handsome flowers from dark pink to purple-brown with purple shaded labellums.

Den. Dang Toi x *lasianthera* is registered as *Den.* Pioneer Princess, and has large flowers, creamy at the base of the sepals and petals, darkening to a rich plum purple at the tips with a purple labellum.

Den. Luwin Lass (Luwin Park x *lasianthera*) is pale greenish yellow darkening to red-brown with green tips, and purple brown lip on a smaller plant, due to the influence of *antennatum* x *tangerine* in *Den.* Luwin Park.

There are many others, all are handsome and strongly show the lasianthera influence in their showy flowers. Many primary and secondary hybrids are still to flower and I have high hopes for *Den.* Tan Lass (*tangerinum* x *lasianthera* var. 'May River red'). A hybrid using the 'Sepik blue' form is very attractive, red-brown with purple lip, and in a smaller statured plant; I hope the red-purple of this pollen parent will boost the colour. Even though lasianthera makes big handsome hybrids, in my opinion at least, it is very hard to improve on the species itself, with its striking colour combinations. I hope to bring down the size of the plants in future hybrids without detracting from the size and colours of the flowers; a tall order but a challenge for the future.

My plants are housed in shadehouses with translucent fibreglass roofs, and all-round louvres for cross ventilation. I use no artificial light or heat and find winter rain must be kept off them, as it rots the tops of new canes and soft new leaf, and cold snaps can defoliate the plants badly. They can and do survive the cold, but not cold winds, hence the louvred windows which are closed off on the weather-side in winter.

6 Holmes Drive,
Beaconsfield,
North Mackay, Qld. 4740.

BOOK REVIEW

by M.J.C. Corrigan

Tropical Orchids of Australia — P.S. Lavarack and B. Gray. With additional notes and illustrations by A.W. Dockrill.

This long awaited work, by three of our foremost workers, will prove to be one of the major references for Australian tropical orchids. It will automatically become the 'modern' companion volume to the classic "Australian Indigenous Orchids" by Dockrill. The authors have combined with the publishers to produce a book with clear typography, good layout, superb drawings and generally superior colour reproduction. A gem!

Contents include: Foreward by Dr. P. Cribb, Introduction, Habitats, Cultivation, Conservation, Classification, Name Changes, Recent Discoveries in Tropical Australia, Natural Hybrids, 5 appendices, Bibliography, Glossary and Index!

Details: 32 pages in colour, 84 plates, 34 full page black and white drawings with facing detailed descriptions of orchids described since the publication in 1969 of Australian Indigenous Orchids.

A book to be enjoyed by all orchid lovers, and one which should be on your shopping list.

Tropical Orchids of Australia —
P.S. Lavarack & B. Gray
Thomas Nelson Australia, 1985,
ISBN 0 17 006538 3
290mm x 220mm, 177p.p.; hardcover, with colour dust jacket.
Suggested retail $39.95.

Sarcochilus australis

by E.C. Westwood

The aim of this paper, therefore, is to examine *Sarcochilus falcatus* and its history with the hope that some evidence may be found that will indicate why it is difficult to cultivate, while it grows and flowers "happily" under natural conditions, where, it may be added, stressful conditions exist.

A genus of more than 50 species, extending from Indo-Malaya through the Indonesian Archipelago to Australia, New Zealand and Polynesia. Fourteen species are recorded for Australia and twelve of these occur in New South Wales.[1] According to Lavarack, we should now include *S. roseus* and *S. serrulatus* thus making sixteen species with twelve in New South Wales.[2]

The type-species is *S. falcatus,* which has four pollinia and a lip different in structure to the Malayan species. These Malayan species were originally included in the Genus *Sarcochilus,* but were later transferred to *Pteroceras* and *Chroniochilus.*[3]

S. australis is a small to moderate-sized temperate epiphytic, and sometimes lithophytic, distributed from Tasmania through eastern Victoria and New South Wales to the extreme south east of Queensland. Often confused with *Parasarcochilus spathulatus,*[4] it grows at altitudes from sea level to 900 metres (3000 feet) and prefers to grow on smooth-barked trees such as Blackwood, Hazelwood, Pittosporum, Eriostemon, Eucalyptus, Sassafras and Rivergum.

Sarcochilus australis is derived from sarcos (freshly) and chilus (lip) and australis (southern). Commonly called 'Gunn's orchid' or 'Butterfly orchid' in Tasmania, it was originally named *Gunna australis* and later *Sarcochilus gunnii.* It is the only epiphytic orchid found in Tasmania.

Ronald Campbell Gunn was an ardent Tasmanian collector of plants who sent many new specimens to England during the period 1840 to 1860. In 1854 he was elected a Fellow of the Royal Society of London and has *Sarcochilus australis* ('Gunn's orchid') commonly named after him.[5]

S. australis was previously named *Sarcochilus parviflorus* or Small Sarcochilus in 1928. This orchid was described by Pescott as follows: "Epiphytal; leaves thin, narrow oblong, somewhat falcate, flower stems longer than the leaves, flowers up to six, calyx lobes and lateral petals greenish, lower petal white, lateral lobes conspicuous, spotted with red.

Long, thin pendant roots are often more than a foot in length which usually indicates the presence of these orchids high in branches of trees.

"Owing to infrequent germination of seeds this species reproduces very slowly. Colonies are not abundant; and one would here enter a plea for its preservation whenever seen. It is not readily established under cultivation, and care is needed to grow it successfully."[6]

One can note, therefore, that difficulty in growing *S. australis* is not a recent problem as it was apparently experienced by growers at least as far back as 1928, at which time this orchid was named *S. parviflorus.*

What causes this difficulty in growing and flowering *S. australis* in cultivation? From my observations, and those of experienced and successful growers, as well as academics, there appears to be four potential problems which may cause cultivation difficulties:

1. Transfer from living to artificial host;
2. Handling and fixing to the new host;
3. Change of environment resulting from relocation; and
4. Subsequent change in watering patterns.

1) Transfer to an artificial host. Mike Harrison states: "One other factor which may also be significant is the fact that *S. australis* grows best on living wood, not deadwood, although, as previously mentioned it germinates freely on dead branches and twigs. These seedlings seldom attain maturity, becoming stunted and sluggish after their initial burst of active growth. Some adult plants are seen on dead branches but these are nearly always plants which matured while the host was still alive. Once the branch dies, these plants usually regress and eventually die".[7]

I can only agree with Harrison's further comments,[8] that it is impractical for growers to use living hosts if they wish to cultivate and display *S. australis,* and my observations also show that most epiphytic orchids prefer a living rather than an artificial host. It is also clear that many growers have good success with *S. australis* on artificial hosts. Therefore it is difficult to state with any confidence that moving *S. australis* from a living to a dead host causes problems in growing and flowering this orchid. However, this may well be the cause of the difficulty experienced in long-term growing of a particular plant of *S. australis,* and to prove this requires greater resources of time and equipment than are at the disposal of the writer at present.

2) Handling and fixing to a new host. Another consideration is that something in or on human skin, or the new host plant, may cause the leaf and root die-back found with *S. australis.* However from rapid root growth witnessed following relocation to the new host, this does not appear to be a problem. Experienced growers have commented on this rapid root growth closely followed by equally rapid leaf drop. It is possible that this sequence, which appears to be common to all unsuccessful attempts to relocate *S. australis,* may provide us with some leads as to the cause of plant loss.

Owen McCall states that many hundreds of *S. australis* on his property in the Otway Ranges fell to the ground after two dry years, commencing in 1981. During this time lichens and mosses on the host dried out and he raises the possibility that these lichens and mosses may contain some fungus which is absent from artificial hosts used by growers.[9] The replacement of fallen orchids, re-strapping them onto local hosts, and maintaining daily watering for some time, resulted in the loss of only a small number of plants and most of the remainder were in flower or bud at the time of writing this article. One can assume, therefore, that the handling and fixing is not a problem if done carefully, and should not contribute to the loss of any plant. Of the many plants I have observed, only a few had lichens or mosses growing on the host, so I doubt if the absence of these in an individual environment would cause any problems. Mike Harrison comments that some plants he strapped to trees near his home appeared to show much slower root growth than those established in his bush house at the same time.

While most growers assume rapid root growth indicates the plant has successfully adapted to its new conditions, I believe this could be a sign of stress caused by the change in environment, with the roots having to grow rapidly to search for moisture and nutrients that would normally be readily available as required. (Refer to the section under "Watering").

3) Change of environment. Photosynthesis is the basic process enabling plant growth. In general terms, in this process sunlight and the chlorophyll in plant cells converts a mixture of carbon dioxide, water and minerals to organic substances which the plant uses to grow and reproduce.

The quantity and quality of light are important factors in photosynthesis, but these are seldom discussed in depth as part of the overall growing techniques. Sunlight is a mixture of different wavelengths from within a small part of the electromagnetic energy spectrum. Ordinary sunlight is made up of a rainbow of colours and it is only light between 400-700 frequencies which promotes photosynthesis, and within this range, 700 wavelengths is more effective than 400. In looking for the most desirable conditions, we should use a shading system which filters out frequencies over 700 as these tend to heat up the leaves, but don't contribute to photosynthesis. It has been found that for most plant species, the rate of photosynthesis varies with temperature and peak photosynthesis for a given light occurs between 20 °C and 30 °C.

All living things respire and this is the use of energy to maintain living cells. In plants, respiration is very much dependent on temperature and has been found to double for every 10 °C increase in temperature.

What does this mean in respect of *Sarcochilus australis*? It suggests that we should, wherever possible, duplicate conditions under which they grow naturally. There is not much sense in taking *S. australis* from a shaded area and giving the plant too much light in its new location, especially if temperatures are already higher. The extra light will increase the leaf temperature and respiration rates even further. It could be suggested that relocation into an environment with unsuitable light conditions is a cause of leaf drop.

To be continued in the next issue.

Notes

1. H.M.R. Rupp "The Orchids of New South Wales" (Sydney 1943) pp. 131.
2. P.S. Lavarack and B. Gray "Tropical Orchids of Australia" (Melbourne 1985) pp. 71; 136.
3. R.E. Holttum, "Orchids of Malaya VI", 1964,
4. A.W. Dockrill, "Australian Indigenous Orchids" 1969.
5. Ronald Gunn also had three streets in Devonport named after him and over twenty plant species bear his name in Latinised form. A bandicoot and 4 species of shellfish also bear his name.
6. "The Orchids of Victoria", (Melbourne 1928).
7. 'Cultivation Based on Habitat Observation -VI *Sarcochilus australis*' in "The Orchadian Vol. 7 No. 8" (Sydney, June 1983) pp. 180-182.
8. Ibid.
9. 'A Forestful of Orchids' in "Your Garden", Vol. 38, No. 11, (Melbourne, November 1985) pp. 76-77.

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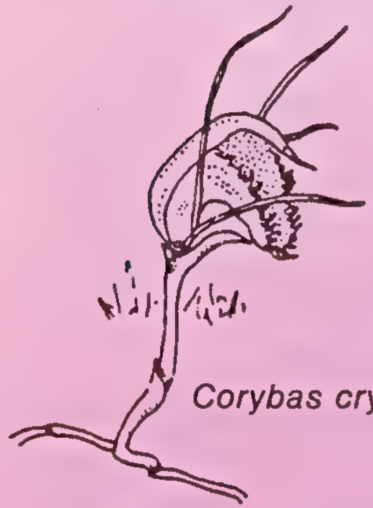

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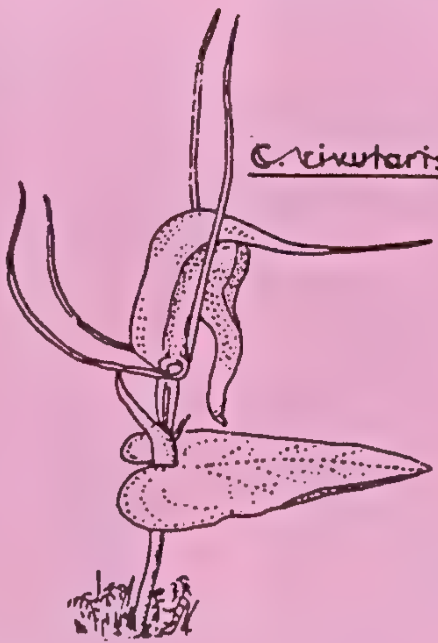

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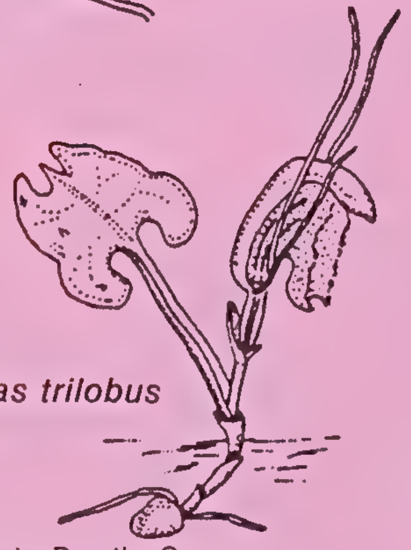

Corybas trilobus

Drawings by Dorothy Cooper.

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BOOK REVIEW

by M. Harrison

Orchids of Western Australia
Cultivation and Natural History

Edited by Kingsley Dixon and Bevan Buirchell.

This 102 page booklet is comprised of a number of separate papers by various authors forming a most informative and pleasing publication.

The short introductory chapter titled "What is an Orchid?" provides a basic explanation of the features of the orchid.

Kingsley Dixon's chapter on the cultivation and propagation of terrestial orchids in W.A. follows. It deals with potting mixes, repotting and the various methods used for propagating terrestial orchids.

Rod Peakall's chapter on pollination mechanisms is a fascinating mixture of history and living biology.

Renowned orchid photographer Ron Herberle has contributed a paper on the botanical history of the orchids of south Western Australia from 1791 - 1971 providing valuable insight into the exploits of the various botanists who worked in that area.

Stephan Van Leeuwin's "Rare and Restricted Orchids" is a precise and definitive treatment of the topic as it relates to Western Australia orchids.

'Orchids of the Perth Area' by A.P. Brown gives an introduction to those species which may still be seen within a 30km radius of central Perth.

The final chapter, by Kingsley Dixon, is 'Tropical Terrestial Orchids — The Orchid Flora of the Kimberley Region'.

This is an excellent publication by an active and dedicated group of orchid lovers. The Western Australian Native Orchid Study and Conservation Group has been one of the most active of the native orchid societies and its members are to be congratulated on their commitment to the objectives of their organisation.

This booklet is highly recommended to both the hobbyist and the serious orchid student. It is certainly deserving of a place in the library of every native orchid enthusiast.

Orchids of Western Australia — Cultivation and Natural History.
Edited by Kingsley Dixon & Bevan Buirchell
Published by the Western Australian Native Orchid Study and Conservation Group. Inc.

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A.N.O.S. Council is pleased to announce that Sid Batchelor, Erhard Husted, Gerry Walsh, Ted Westwood and Ron Wheeldon have been granted the status of A.N.O.S. certificated Judges. The course was intensive and demanding to both candidates and judges, and congratulations are in order to both parties. Further courses will be offered in the near future as the program of expanding the panel of judges continues.

The Orchids of the Brisbane Forest Park

by C. Ralph Crane

My wanderings in the Brisbane Forest Park commenced in June 1984 because of my interest in orchids and the close proximity of Brisbane Forest Park to where I live; the idea being to put together a list of orchids from the area to supplement a number of existing lists from small portions. Permits to collect for scientific reasons were obtained from relevant authorities before commencement.

The Brisbane Forest Park is situated on the north-west side of the city extending from Mt Coot-ha in the Taylor Range to beyond Mt Glorious in the D'Aguilar Range. It covers an area of 25,000 hectares made up of State Forest, Brisbane City Council water catchment area, and a number of small National Parks.

The Brisbane Forest Park Authority is responsible for the management and coordination of recreational activities within the park. The vegetation in the park varies from the open woodlands in the west to areas of rainforest, rocky mountains descending to gorges and valleys. Altitude varies from Mt Glorious and the surrounding area at 700 metres to areas close to the city at 75 metres above sea level. All of this means there is a wide diversity of habitats for orchids.

Dendrobium

D. speciosum* var. *hillii is wide spread, occurring as an epiphyte and as a lithophyte. Some specimens high in trees have grown to substantial sizes with up to 50 or more canes on some plants.

D. kingianum occurs as a lithophyte, and covering large areas on rocks and, in some cases, almost whole hillsides, showing varying colours of pink during flowering. This species was severely affected as a result of some controlled burns in some areas (of which I was rather critical at the time). In one instance there was a clump with some 100 canes growing on a lone boulder. This clump of orchids was reduced to black stubble 10-20mm long by one of the burns.

Upon returning some three months later, I was surprised to see much regrowth on this clump. A quick count showed some 45 odd new canes. While looking over a patch in flower with an old bush mate one day, I heard a joyful voice say, 'I have a white *D. kingianum*'. This was something he had never seen in nature (which makes two of us). Upon sliding down the rocks, I heard a mumble ... 'It is only a *... *... of a *delicatum*'. This was something that I had not seen in the bush up to that time ... one of those times I wish I had a tape recorder.

***D.* X *delicatum*.** The plant mentioned above, had a very small growth. Something you would never pick from a *D. kingianum* when not in flower for only then did its colour give its presence away. Another plant, located in a different area, was a very sprawling specimen lodged on a narrow rock shelf and growing down the rocks, aerial upon aerial, on to the leaf litter below. It suffered badly in the fires and has shown nowhere near the vigour of regrowth that the *D. kingianum* has.

***D. macropus*. (*D. gracilicaule*).** This is a widespread and common orchid on rocks and trees. Some plants high in the trees have grown to substantial size with up to 50 canes per clump. This species appears to be found wherever *Dendrobium speciosum* occurs.

***D.* X *gracillimum*.** This has also been observed over a wide area though only as odd plants, with the exception of one area of damp forest along a creek where quite a number occur high in the trees. In another area, high in the headwaters of a creek is a rock face covered with them. It was found that lantana had overgrown the creek, barring entry from the lower approach. Access may be a little easier after the next burn.

***D. linguiforme*.** This has been found widespread on rocks and trees often covering large areas. Some clumps on rocks are quite exposed to the elements, in which case the plant growth and size is nowhere near that in more protected areas. In one place where it occurs on Brush Box trees, the mats are up to 0.9m long and surround the host tree. Such specimens become evident from some distance during flowering.

D. aemulum is widespread in what appears to be two differing growth forms. The more common one occurs on Ironbark trees with 2 to 6 canes, very seldom in excess of 50mm long and some 5 to 8mm thick; whereas those occurring on old Brush Box trees (nowhere near as common) have canes growing up to 200mm long and more and up to 10mm thick. These plants often have 12 or 15 canes. This species appears to be very sensitive to altitude; when descending from a ridge the plants stop occurring halfway down and re-commence halfway up the next ridge. They have not been seen below 250 metres in the Park.

D. teretifolium. Both *D. teretifolium* and *D. teretifolium* var. *aureum* are common in the same area of rainforest around the 700 metres altitude. *D. teretifolium* is much more widespread, extending to lower altitudes in much more open situations. It has also been observed in a number of places, growing as a lithophyte around open creeks. These two species differ in growth form. *D. teretifolium* branching at right angles and forms a much larger plant than *D. teretifolium* var. *aureum*, which hangs down relatively straight, often growing to around 2m and more in length.

D. mortii has ben recorded from a wide variety of habitats, from upper branches of closed forests to relatively open rocks. None of these plants have grown to any significant size.

D. beckleri. This favours the Hoop Pine trees. Whenever a fallen branch of any size is seen one can be relatively sure there is *D. beckleri* present. One old fallen pine tree in a creek, which I guess had been down some twelve months, had about 200 plants on it, some of which had been fair size specimens. These orchids were slowly being eaten by the wallabies.

D. tetragonum occurs, in most cases, in the moister, more shaded areas of the forest. There appears to be a wide variation in cane lengths, some growing to 30cm and more, other plants only reaching 10cm. This does not appear to be just a matter of juvenile plants, as plants with some 8 to 10 canes will be of the short type and plants of 4 to 6 canes have been seen of the long type, both having flowered.

D. pugioniforme. This has been at inaccessible heights until some road widening took place. This allowed access to fallen plants in flower for collecting and recording specimens. This species has only been located in the high areas of the Park at the 700 metres altitude. It is in this area I hope to be fortunate enough to locate *Dendrobium schneiderae, Bulbophyllum elisae* and *B. bracteatum.* Also recorded at this altitude within the Park are *Bulbophyllum exiguum, B. crassulifolium* and *Dendrobium teretifolium* var. *aureum.* All of these species I have seen growing together on the main Dividing Range at approximately 700 metres.

D. monophyllum is a species which likes good light. Often it can be found growing in full sunlight or on the hot north-west face of rocks where it often grows in large clumps. Also, it is often seen in the top of trees in a good light situation. This species appears to flower at any time of the year.

Cymbidium

All three native *Cymbidium* species occur within the Park boundaries.

C. suave. This is by far the most commonly occurring *Cymbidium* species, found in almost every corner of the Park: in the familiar old broken off limb, as well as some big specimens in old tree stumps and logs on the ground.

C. madidum is well spread around, but sparce in numbers; occurring from the drier open woodland to the damper forest areas.

C. canaliculatum has been seen on only two occasions. The first was a mature plant of six bulbs high in an old tree, the other being a clump of 20 odd seedlings which had germinated in a charcoal log on the ground. Not a very good place to try to get established as the wallabies appear to have quite a taste for orchid shoots.

Bulbophyllum

Four *Bulbophyllum* species have been located.

B. exiguum has been recorded as growing on the limbs and trunks of trees in the closed forest at the higher altitudes and along creeks and water courses. In two open rocky areas, this species occurs as a lithophyte in large mats. One of these exists on a dry south-west rock face and the other on a south-east rock face. These discoveries show the adaptibility of *B. exiguum* to various environments. Despite this variety of habitat, this species appears to be quite difficult to grow in the bush-house.

B. crassulifolium. This is present in all the above locations with the exception of creeks and water courses.

B. aurantiacum has been difficult to locate with odd small finds on fallen branches and trees during roadworks, with one other location in a creek bed.

B. minutissimum occurs on quite a number of rocky knobs and mountains, covering quite large areas of rocks in thick mats growing with lichen. It survives only on the higher rock faces where it is not affected by fire. Most plants are in very open situations. Where one mat was growing in full sun on the north-west face, the bulbs became very red in colour, while only centimetres away another growing in a crevice had quite green bulbs.

Oberonia

Two species of *Oberonia* are present in vastly different situations within the Park.

O. muellerana prefers the open, dryer situation in the tree-tops and on rocks.

O. palmicola favours the creeks and water courses in reasonably good light. It is a sight worth seeing when a good clump of either species is located in flower.

Plectorrhiza

Two species of *Plectorrhiza* are found within the Park.

P. tridentata grows on outer twigs and branches from the closed forest through to any patch of damp, open forest, particularly adjacent to creeks.

P. brevilabris. This was a pleasing find, but I have only seen two plants at this stage. One on a rock in the creek bed, the other as a true epiphyte. I was aware of its locality close to the north-east end of the Park boundary before commencing this project. This brings the southern limit of this species as far as Brisbane, which is a new southerly boundary for the records, as far as I am aware.

Rhinerrhiza

R. divitiflora. The "One Day Wonder" is well represented and distributed in the Park, favouring the moister, darker areas. It is a plant often difficult to locate when growing at any height, the exception being (if you are lucky) when it is in flower.

When passing a familiar tree one day, I spotted some colour about 6m up. A closer look showed three plants and 9 spikes in flower of *R. divitiflora* lost among the creeping fern.

Papillilabium

P. beckleri. A small epiphyte which could be overlooked as a juvenile *Plectorrhiza tridentata*. It is commonly found on the outer twigs of Lillypilly or Water Cherry trees overhanging the creek. It is pleasing to have located this species in a number of sites on different sides of the Park.

Peristeranthus

P. hillii. This has been found in a limited number of locations in the Park. One area has a considerable number of plants over a wide area, some of these having three heads and being of considerable size. The largest would not fit in a 20 litre drum without bending leaves. It is a plant favouring moist, cool areas in heavy shade.

Taeniophyllum

T. muelleri. This was found as a small, dehydrated plant on a small, dead Hoop Pine branch along the creek bank and appears to be a case of return for further investigation.

Liparis

L. reflexa occurs on a number of shady, moist rockfaces, as well as one area which is a fairly open, dry south-easterly rock area, forming large mats in both cases. It was interesting to watch and record on camera what we presumed to be the pollination of a flower by a small reddish blowfly.

L. coelogynoides. This is another species difficult to separate from a climbing strapleaf fern. Again, it is given away when in flower. This species is quite common at the higher altitude from observations made in the flowering season.

Pteroceras

P. spathulatus. This has been recorded on occasions on the lower tree trunks of smaller trees, but when tree felling occurred for road widening, it became obvious that this species was more prevalent in the upper parts of the closed forest. Once I saw 20 odd plants growing in a clump of mistletoe.

Sarcochilus

The genus *Sarcochilus* is well represented in the Park.

S. falcatus. This is well distributed in varying conditions through the Park. In some areas it is found on the older Brush Box trees, in another on old Wattle trees and still another on old Stinging trees. The majority have flowers that are white with yellow lobes but occasional plants have been observed to have the purple streaking.

S. olivaceus. This favours damper, darker areas on small, shrub-like trees, relatively close to the ground. This species is well spread over the Park around creeks, the rainforest and the gorge. One area produced quite a few plants growing as lithophytes on the side of a creek bank. At the same site there were a number of plants of *S. ceciliae* growing on the same rock.

S. ceciliae. This is found in varying situations, one being on rocks in a sunny position and another in the creek bed, which would be covered by water during heavy rain. It is also found in creeks occurring in heavy shade on mossy rocks, on the exposed roots and the base of Hoop Pines and on dry, open rocks along a fairly dry creek in open forest where plants do not grow to the size they do in the more moist situations. They all flower with a similar vigour regardless of the situation. While checking a rocky area late in Spring for the second time I noticed clusters of pink flowers along the ground line. Upon a closer look there were *S. ceciliae* plants growing happily under a cover of leaves with the flower being the only tell-tale sign once more. Once this was realised, many more plants have been seen which could easily be overlooked in this situation. Although I have seen thousands of plants in the Park, I have yet to locate that elusive variety *albus*.

S. dilatatus. This is located at two vastly different habitats, both favouring the outer branches of small trees and shrubs. One is relatively dry, open creek in woodlands where it is restricted to those shrubs growing next to the creek. The other area is in closed forest, very heavily shaded and with damp, mossy rocks below. Here it occurs both in and well up the creek banks.

S. hillii. This is scattered along creeks in a number of areas. It is interesting to note that wherever *Papillilabium beckleri* has been located *S. hillii* has also been present.

. . . .

To visit some of the areas requires quite a rugged day's outing. One such day went like this: Left home 5.00 am with two vehicles. On arriving at the point where we wished to leave the road, we had to proceed a further 15km to leave one vehicle where we would come up from the gorge and then return with the other one to our departure point. Sliding over the road side (I mean sliding from tree to tree as it was too steep to stand) at 6.45 am, we began the very steep descent through the rainforest, lawyer vine (wait-a-while) everywhere, to the gorge floor. On the way down we missed a 30 metre waterfall; it will keep until next time. To descend through the gorge, we had to pass through three waterholes by wading and on three occasions by swimming. The alternative was to climb up and then down the very steep, loose rock hills on each side. These were about 75 metres high, making a wide detour from our way. We reached the second vehicle at 5.15 pm. The distance from point to point as the crow flies is 4km.

Some time was spent looking but an area like this is of such great interest, darkness could easily beat you if you are not careful. This is where an old saying comes true, I believe, that 'you do not have to be mad, but it definitely helps'. It is on a day like this we tend to say, 'I wonder what the poor people back in the city are doing at work today'!

Acknowledgements

I would like to express my appreciation to the relevant authorities for the opportunity to conduct this survey and record with the Queensland Herbarium the species located. Also, my thanks to Mark Clements of the National Botanic Gardens, Canberra, for identification and confirmation of some species. A photographic record of these plants in flower in their natural habitat is being compiled, where possible, by Stephen Crane. Up to this point of time 37 epiphytic and 32 terrestrial orchids have been located and recorded.

17 Rylatt St
Indooroopilly
Qld 4068

9 Sept 1986

The History of the Discovery of *Yoania australis*

Reprinted from Cooper's Group Newsletter 6 June 1983.p. 5.

by E.D. Hatch

On 28 January 1955 Elizabeth Kulka found an odd and solitary orchid growing in deep leaf mould beneath an old man taraire on the banks of the Waipoua river in Northland. She gathered it up, slipped it into her Listener or Woman's Weekly or whatever she was using as a holdall, and brought it back to the University at Auckland.

Here it passed from hand to hand, poked, prodded and dissected until, on 28 May 1955 it came to Colwyn Trevarthen's notice. He scribbled a pencil note (which I still have) and sent Miss Kulka down to me with the specimen. It was certainly odd. A series of small leaf-bracts scattered up a reddish pubescent stem with 4 small, much-dissected flowers at the top. The seed capsule proclaimed it an orchid but I was sure that nothing like it had ever been reported from either Australia or New Zealand. I made a sketch of the specimen and wrote a brief account of its discovery for the Auck.Bot.Soc. Newsletter (September 1955.p 3 Fig.) and repeated this under the heading 'the Waipoua orchid' in Auckland's Orchids 1959. I could do no more.

Eight years passed, and on 10 January 1963, Phyll Hynes rang me from the Museum (Auckland). A plant corresponding to the Waipoua orchid had been brought in from Glorit on the Kaipara. Mr J. Beever with his son Ross, had gathered it (still from under mature taraire) on Christmas Eve 1962 and had nursed it carefully for 3 weeks in order to get it back alive. A block of assorted leaf and root debris, tucked into a foil strawberry chip, contained a tangled mass of branching rhizome, totalling 62cm in length, on which were 3 flowering stems and 4 more just breaking the surface. The whole was intertwined with long white fungal hyphae. The most striking thing about the plant (and something the original Waipoua specimen had not told me) was that it had no chlorophyll — not a trace of green anywhere. Obviously saprophytic and mycorrhizal, probably in association with the taraire. From this material I made a drawing and drew up a description — but what to do next? I still had no idea what it was nor where it had come from. What I needed was someone with an extensive and world-wide knowledge of the orchids. The obvious answer was Leslie Garay, with whom I had earlier worked on *Corybas cryptanthus*. But Garay had disappeared from the University of Toronto and no one seemed to know where he had gone. I wrote a note to Garay and enclosed a xerox of the drawing and description, and sent the whole to an old friend and mentor in Arizona, Dr Lucy Cranwell Smith. Lucy ran Dr Garay to earth at the Oakes Ames Herbarium in Harvard University and sent the stuff on. Garay, with his usual wholeheartedness, sent me a stack of notes and drawings, and a definite opinion — 'it is a new species of *Yoania*'. After studying all the material I began to doubt that this was a true *Yoania*, but what to do? No one else had any clues at all and I had already sat on the plant for 8 years. I proposed as a loophole the subgenus *Tarairea* and described the Glorit material as *Yoania (Tarairea) australis* in Trans.R.S.N.Z.Bot. 2:1963.p 185 Fig.

Twenty eight years later it would still seem that the plant is not a *Yoania*. Nor does it belong in *Galeola* (as Garay once suggested) which has winged (split) seeds which are quite unlike the neottioid seeds of *australis*. Dr Moore's opinion (Flora 2:1970. p 165) would seem to be sound. Dressler and Dodson's comment (Annals Missouri Bot.Gard. 47:1960.p 52) '... an autogamous saprophyte is nearly the ultimate in taxonomic difficulty' is perhaps some salve to my dissatisfaction and left to myself I would raise *Tarairea* to generic rank as an endemic, monotypic genus of unknown affinity. But this would entail electron-microscopic study of the seed, which is out of my province.

The plant has proved, as I originally suspected, to have much the same range as the taraire, on which it appears to be epiparasitic by way of the puffball *Lycoperdon perlatum* (E.O. Campbell Trans.R.S.N.Z. 12:1970.p 5).

Distribution (first record) — in every instance with taraire.

28.1.1955 Waipoua State Forest, Northland; E. Kulka
24.12.1962 Atuanui State Forest, Kaipara (Glorit); R.E. Beever
1.1.1967 Kirk's Bush, Papakura; J. Horsman
18.2.1967 Kaukapakapa, Kaipara; L.H. Moore
15.12.1973 Kare Kare, Waitakere Ra.; R.E. Beever
10.1.1982 Taiharuru Bay, N.E. Coromandels; J. Smith Dodsworth
4.1.1983 Burrill's Bay, Great Barrier Island; A.B. Grace

There are voucher specimens in Auckland from all these localities except Kaukapakapa, which are in Christchurch. Oddly enough, in spite of a mass of taraire and a number of botanically-minded foresters, only the one specimen has ever come out of Waipoua.

Yoania australis is a very difficult plant to find, even in areas from which it has been recorded. It would seem to flower at erratic intervals, sometimes not appearing for several seasons at a time. This would seem to be related to the epiparastical habit. Green-leaved plants (*Pterostylis banksii* for instance), must come up each year, not only to flower and set seed, but to make a new tuber so that they may continue to survive. *Yoania* and its fellow epiparasites are under no such compulsion. They do not so to speak, have to come up to eat and only flower when they feel sufficiently robust. Another problem is their rapidity of development — 12-18 days from the fertilisation of the flower to the dispersal of the ripe seed. One plant I examined with 7 flowers, the uppermost open and still unpollinated, the second uppermost open but with pollen on the stigma, had its lowest flower with the seed-capsule dehisced and empty and all the seed dispersed. Alick Dockrill told me of plants of *Gastrodia queenslandica* he observed, which took only 4 days from the first appearance of the plant above the ground to the dispersal of the ripe seed. The botanist in these cases needs to be literally standing waiting when the plant shoots through.

25 Tane Rd.,
Laingholm,
Auckland 7,
New Zealand.

Photosynthesis, CAM and Australian Orchids

by E.C. Westwood

When undertaking a study recently relating to *Sarcochilus australis* and the reasons why this species is difficult to cultivate*, the author became convinced that *Sarcochilus australis* used the CAM system of photosynthesis and that this may be the main reason growers have problems with this beautiful little orchid.

When reading an article by Dr. Ben Wallace, which was presented at the Eighth Australian Orchid Conference in Townsville, it was interesting to note that tests have been completed on other *Sarcochilus* species and have proven these are CAM system orchids. Among these were *Sarcochilus falcatus, S. hillii, S. ceciliae* and *S. moorei* which generally are easily grown and flowered over many years. A question then arises as to why *S. australis* is difficult to cultivate if it uses the same photosynthesis method as similar species.

Further research on this subject has uncovered some clues but no conclusive answers. This subject is of interest to the author and may also be to others, so the opportunity is taken here to briefly summarise photosynthesis and the CAM system in a manner that should be easily understood by the non-botanists like myself.

Photosynthesis is the most fundamental of all processes that take place in plants and is basically the taking into the leaf of carbon dioxide (CO_2) in gaseous form and the combining of this with water taken in by the roots to produce simple sugars such as glucose. This reaction is powered by energy extracted from sunlight by chlorophyll in the plant with the sugars forming the basic ingredients which sustain the life of a plant.

Photosynthesis variants.

Basically there appears to be three systems relevant to Australian native orchids which are all important in our endeavours to understand fully how best to cultivate species in each category. These variants are:—

Calvin/C_3 Pathway. This is the basic system of photosynthesis whereby there is a positive correlation between light and the opening of stomates in the leaf to allow the intake of gaseous CO_2. Named after Calvin who first described this method satisfactorily, the C_3 pathway is considered to have originated in the very first plants and has been maintained throughout evolution by all plant groups.

This basic system however has disadvantages when operating under some conditions, which are:—

The enzyme (proton) responsible for fixing the CO_2 has a low affinity for that gas and requires large amounts of this protein which is the most common in the leaf. It is necessary however for stomates to remain open for a considerable time to obtain sufficient CO_2 for photosynthesis.

When stomates are open, water vapour can move out, which is not a problem if humidity is relatively high or water is readily available. In arid conditions however this causes loss of moisture through the open stomates and the rate of dehydration sustained during the hottest and windiest time of day may lead to unacceptable water deficits.

Therefore if plants growing in arid environments are able to restrict the opening of their stomates to times when air humidity is high then water loss by evaporation would be greatly reduced.

CAM System. This method was first discovered in the family Crassulaceae with the basic principle of this system comprising Acid Metabolism hence the derivation Crassulacean Acid Metabolism or "CAM".

Because photosynthesis depends directly on light the intake of CO_2 in non-CAM plants occur during the day, during which time problems detailed above would occur. CAM system plants however restrict the opening of stomates and the subsequent intake of CO_2 to night when evaporative power is lowest and humidity highest.

Basically the CO_2 is "Carboxylated" (The chemical binding of CO_2) into Malic Acid and stored in the leaf during night. With morning light photosynthesis begins and the Malic Acid is decarboxylated back in to CO_2 in the leaf which in turn causes the stomates to close. During the day CO_2 is slowly released until leaf acids run down ready to start the CAM system again the following night. During the afternoon, when all Malic Acid and CO_2 are exhausted, the low concentration of this in the leaf causes stomates to open and the cycle starts again.

Intermediate CAM/C_3 System. This system may well explain the difference between species within the genus *Sarcochilus* and why *Sarcochilus australis* differs from others tested as operating as CAM system orchids.

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* This study is being published in two parts in The Orchadian; the first appeared in the last issue (Sept.) and the second appears in this issue. Editor.

The above CAM System is known as 'true' or 'high' CAM. There are apparently some plants that operate in an intermediate mode somewhere between true CAM and the C_3 pathway.

Others known as 'low CAM', operate mainly on the normal C_3 pathway but revert to CAM under conditions of extreme stress. These plants need to be shocked into changing from C_3 to CAM and this is usually done by extreme temperature conditions or lack of moisture. Moisture stress appears to be a requirement to start CAM but this can fail if night temperature exceeds 15°C above which stomates will not open and CAM therefore cannot fully operate.

When the temperature is too high for stomates to open or water stress is too high, the only CO_2 fixed is during respiration and CAM is operating purely as a survival mechanism in this case although it may be able to operate under these conditions for months or years.

While temperature and water stress affect opening of the stomates air evaporative power can influence the aperture size of the stomates. Dry air generally causes the aperture to narrow, while humid air results in slower water loss and subsequent wider aperture opening. These stomatal controls appear not critical to CAM plants, since stomates are open at night when air evaporative power is usually low.

No doubt the main feature of CAM orchids is their ability to adapt to adverse conditions by limiting opening of the stomates to periods in which evaporative power of the air is at a minimum, thereby greatly reducing water loss. CAM therefore is critical to favourable water balance in the plant and allows carbon fixation and normal growth to proceed.

Orchids growing in arid conditions have used CAM to successfully adapt and flourish in environmental conditions that would prove fatal for non-CAM plants and certainly accounts for the ability of some *Sarcochilus* and other species to become prolific in areas unsuitable for those orchids that use the C_3 pathway.

References

Dr. S. Jacobs Photosynthetic adaptations. *Adaptations*

Dr. B. Wallace The occurence of water conservation device Crassulacean Acid Metabolism (CAM) in Australian orchids. *Adaptations*

Dr. B. Wallace CAM is an important adaptation in Epiphytic orchids. *Adaptations*

Note: *Adaptations* is a publication of the Royal Botanic Gardens, Sydney. Education Unit.

2 Bluegum St.,
Normanhurst 2076.

Sarcochilus australis

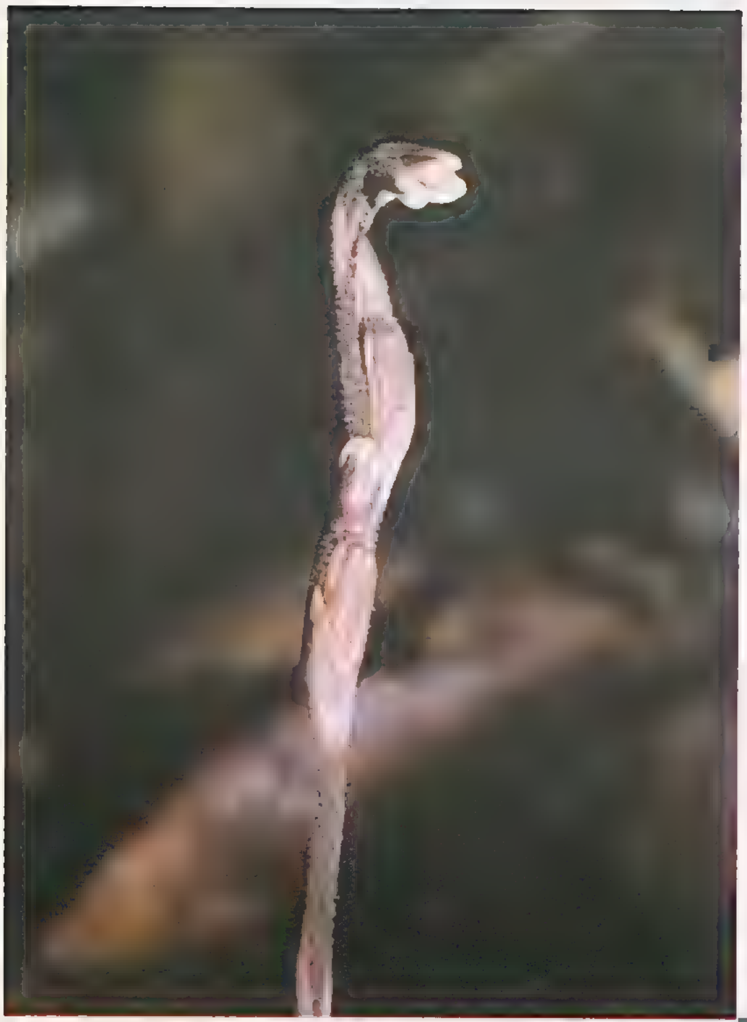
Continued from the Sept. issue.

by E.C. Westwood

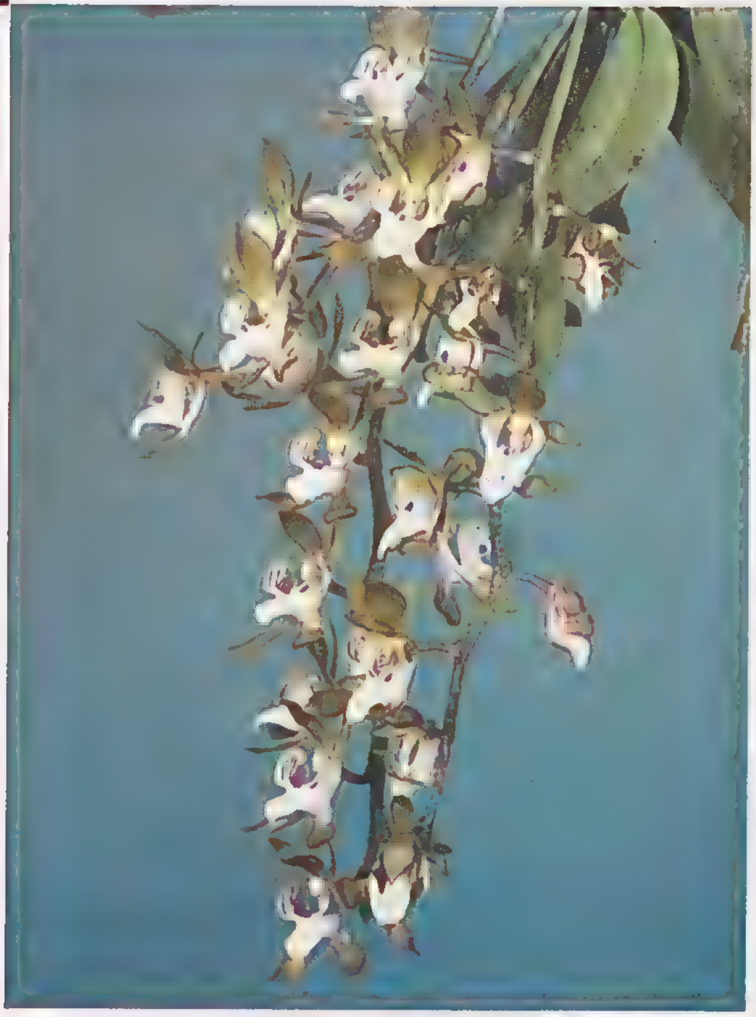
4) Watering When presenting his paper at the Orchid Society of New South Wales Orchid Workshop in 1985, Dr. Ben Wallace commented that very little, if any, moisture was taken in through the leaves of Australian Native Orchids. Therefore all moisture is taken in through the roots and it stands to reason that the larger and healthier a root system, the more moisture can be absorbed.[10]

According the Dressler: "Orchids, being monocots, never have a carrot-like taproot and never have a primary root like most dicots.[11] One of the features found in most orchid roots is the velamen or in older terms velamen radicum. This is an outer layer of cells with partially thickened cell walls which lose their living contents as the root matures. The velamen is usually a spongy, whitish sheath around the root, and between the velamen and the cortex is a special layer of cells, the exodermis. There has been some controversy over the function of the velamen, but Capesius and Barthlott (1975) and Barthlott (1976a) have shown that aerial roots do not absorb water and nutrients through the velamen (except in vanilla). Having a spongy, water absorbing layer around the root seems clearly adaptive by epiphytes. Went (1940) suggests that the great value of the velamen lies in its ability to catch and hold the

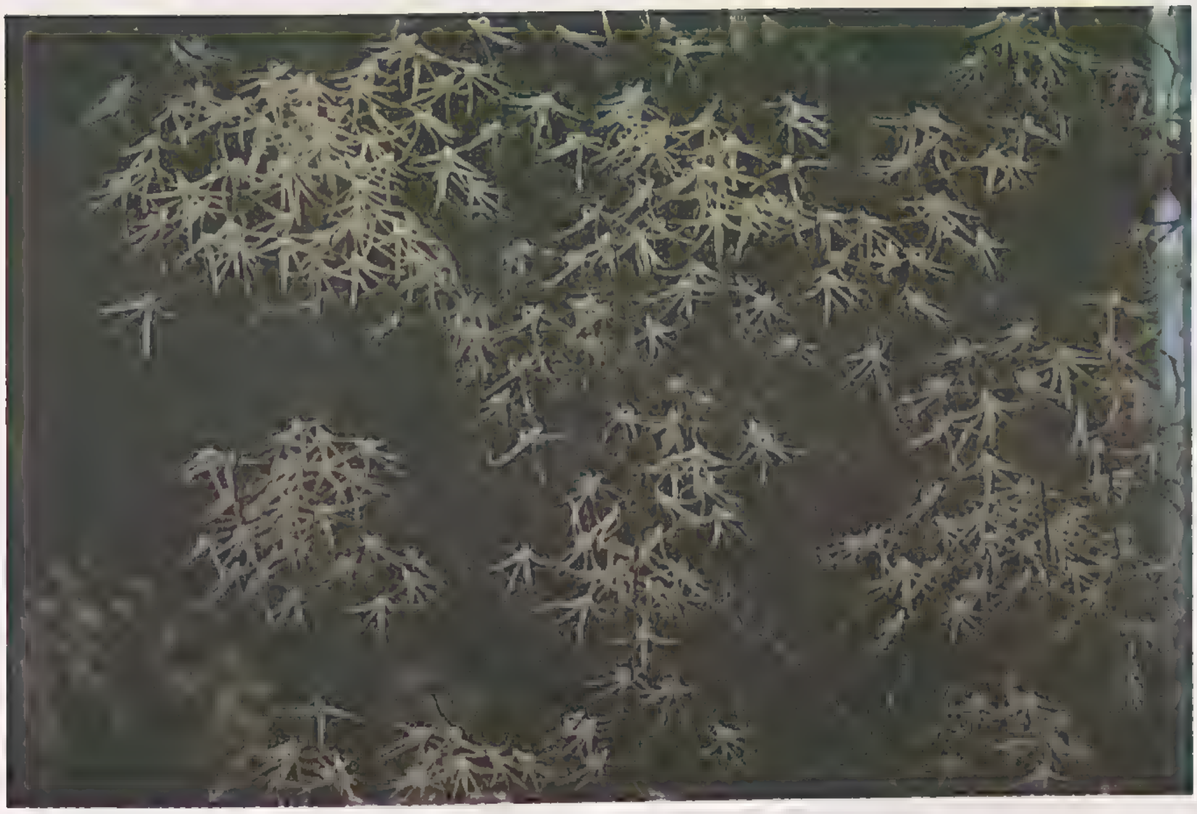
Continued page 212



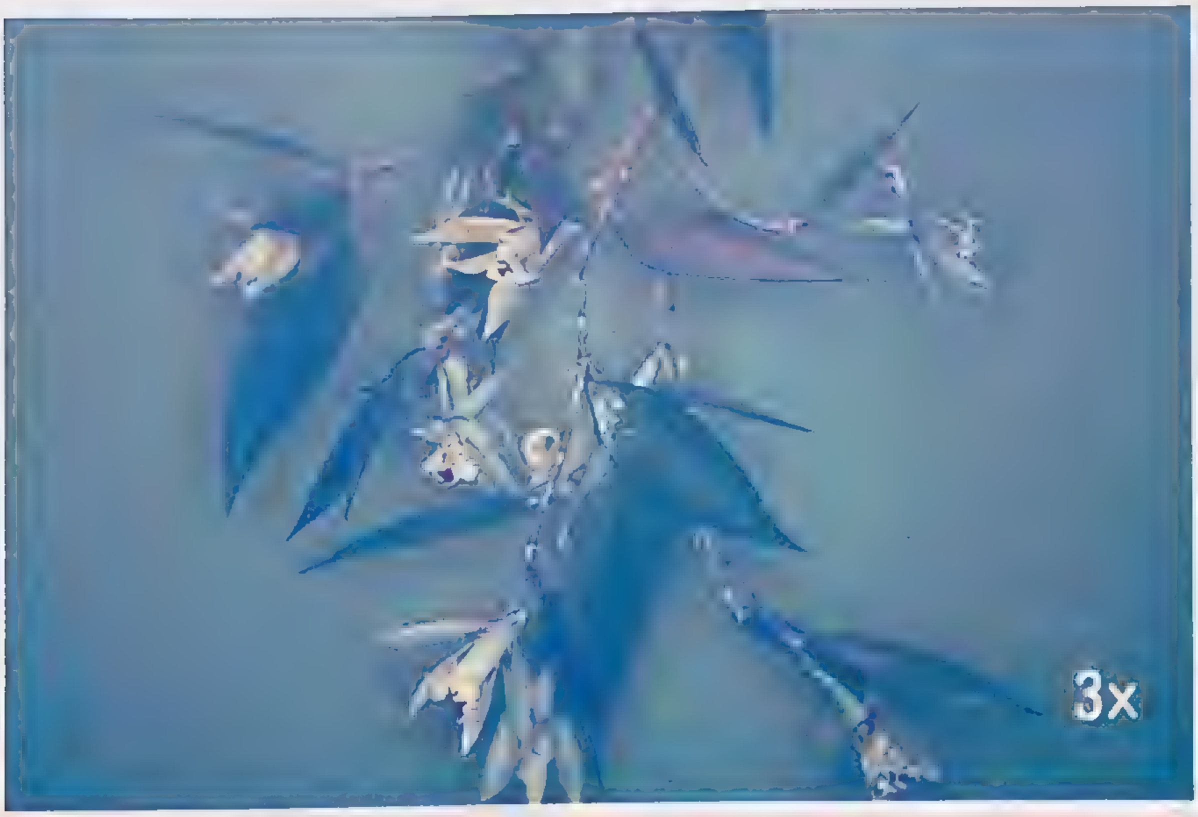
Yoania australis
Photograph by E. Hatch.



Sarcochilus australis
Macdonald River, N.S.W.
Photograph by E. Gordon.



Dendrobium teretifolium* var. *teretifolium
Photograph by E. Gordon.



Dendrobium pugioniforme
Photograph by E. Gordon.

first, relatively nutrient rich water to reach its roots when it rains."[12]

As discussed previously, photosynthesis is the process which enables the plant to manufacture food and thus enables plant growth. This process usually takes place during the day. In his paper to the 8th Australian Orchid Conference, Dr. Ben Wallace explained how Crassulacean Acid Metabolism (CAM) works with CAM system orchids. Because photosynthesis depends on light and the taking in and fixation of CO_2, it usually occurs in the daytime. The CO_2 is carboxylated into Malic Acid and stored ready for decarboxylation back to gaseous CO_2 the next day. With the morning light this process commences and the increased concentration of CO_2 inside the leaf causes the stomates and pores to close. This daily function gives rise to the term Acid Metabolism (AM) and CAM being first discovered in the family Crassulaceae (C) gives the derivation CAM. This CAM process is used by plants so that stomates are closed during the day and cannot lose water vapour when taking in CO_2, as is the case with non-CAM plants. Therefore plants growing in arid conditions can restrict the opening of their stomates to periods in which humidity is high and the rate of evaporations low, thus water loss is kept to a minimum.

S. australis is normally found in rainforest areas or around permanent creeks where one could assume the level of humidity during the night would be high, with the atmosphere drawing heat from the ground and/or water. In light of this, it could be suggested that *S. australis* is a CAM orchid. This the level of humidity during periods of low light, i.e. the night, is an important factor to be considered in the growing, flowering and propagation of this orchid.

While this paper does not conclusively prove that *S. australis* is a CAM orchid, the above discussion raises this possibility. This gives rise to the question of relocation, and the possibility that relocation of *S. australis* in an environment not suitable to the CAM system of respiration and photosynthesis may be the key factor to failure in growing this orchid.

Mike Harrison comments that the key to successfully growing *S. australis* lies in a healthy root system and this, in turn, relies on watering.[13] If this was the case, relocating *S. australis* should not detrimentally affect the plant if it has a good root system and is watered infrequently or by natural rain only. However, experiments I have conducted along these lines have not produced satisfactory results. Whilst relocation has been followed by good root growth, and watering has been maintained at natural levels, without exception, the experiment has resulted in plant loss. An experiment I conducted, which located plants above a fish pond followed the same pattern of rapid root growth followed by leaf drop, and resulted again in plant loss. This leads me to suggest that factors in addition to watering, are involved in this problem.

What makes *S. australis* difficult to grow in cultivation for more than three to four years, whilst it flourishes in areas of New South Wales which appear to experience arid conditions? In his book, Firth says that *S. australis* can be relocated, but in doing so an unusual change occurs. In its natural surroundings, *S. australis* is beautifully and strongly scented, and this scent is often used to locate them in dense bush. When relocated, the plant may flower profusely, but will completely lose its scent.[14] It seems possible that this is a result of our inability to reproduce a suitable environment for *S. australis,* and this, it seems, could be due to the relocation of these plants in environments unsuitable to CAM orchids.[15]

Summary The primary question raised by this paper is concerned with the possibility that *S. australis* is a CAM orchid. If this is the case, the following questions may also be relevant to the subject at hand:

Being a CAM orchid, *S. australis* would open its stomates during periods of lowest light intensity, i.e. the night. It would store its requirements during this time, ready for photosynthesis the next day, during which the stomates close the preserve moisture.

If *S. australis* is moved to an area with a low level or absence of humidity at night, the CAM system would not operate effectively, thus causing stress and initiating rapid root growth as an attempted compensation for the low level of humidity.

If the plant was still unable to compensate for an environment which was not suited to the CAM system, the plant would utilise the stored nutrients in its leaves. When all the plants reserves are exhausted and the CAM system still cannot function, the leaves wither slightly and drop, and hence what appear to be healthy leaves are often found on the ground the next day.

Possibly the stressful conditions experienced by a relocated plant result in the loss of scent.

The theory presented above is based on some experiments conducted in bush house and glass house conditions, as well as observations made in natural conditions, and ideas formed whilst reading numerous articles.

If *S. australis* is not a CAM orchid, then this paper is at a loss to explain the extreme difficulty experienced in growing and flowering over long periods of time in cultivation; yet *S. australis* flourishes in its natural environment, in which many other Sarcanthinae would die.

Conclusion This paper does not make any definite conclusions relating to the original question put forth. It does however expand upon the original question of the difficulty of cultivation and suggests some possible explanations.

The writer will certainly continue with experiments relating to *S. australis* and will hopefully, one day, discover the secret of this beautiful Australian Native Orchid.

Notes
Continued

10. Held in the P.G. Price Theatre, Macquarie University, July 1985.

11. "Monocot" is an abbreviation of the term Monocotyledonae, which refers to flowering plants, usually with one cotyledon (Cup-shaped structure) in the seed. These plants feature leaves with parallel veins and flower parts in threes or multiples of threes. Monocots usually have little or no woody tissue. "Dicot" is an abbreviation of the term Dicotyledonae, which refers to flowering plants, usually with two cotyledons in the seed. These plants have leaves with veins that form a network and flower parts in four, fives or multiples of these numbers. Dicots commonly have woody tissue.

12. Dressler, "The Orchids Natural History and Classification" (London 1981).

13. Private conversation held with Mike Harrison, whilst conducting research for this paper.

14. M.J. Firth, "Native Orchids of Tasmania" (Devonport 1965).

15. However Rupp also quotes "5-14 fragrant flowers" in *The Orchids of NSW,* 1943, pp. 134. It is evident that these orchids do have a strong scent in their natural environment, while several growers consulted have commented on the lack of any fragrance from *S. australis* when it is in an artificial environment.

Bibliography

Curtis, W.M., *The Student's Flora of Tasmania Part 4A* (Hobart 1979).

Dockrill, A.W., *Australian Indigenous Orchids* (Sydney 1969).

Dressler, R.L., *The Orchids Natural History and Classification* (London 1981).

Firth, M.J., *Native Orchids of Tasmania* (Devonport 1965).

Lavarack, P.S., and Gray, B., *Tropical Orchids of Australia* (Melbourne 1985)

Harrison, M., "Cultivation Based on Habitat Observation — VI *Sarcochilus australis*' in *The Orchadian Vol. VII No. 8* (Sydney June 1983) pp. 180-182.

Holttum, R.E., *Flora of Malaya Vol. VI* (Singapore 1964).

McCall, O., "A Forestful of Orchids" in *Your Garden Vol. 38,* No. 11 (Melbourne November 1985) pp. 76-77.

Pescott, E.E., *The Orchids of Victoria* (Melbourne 1928).

Rupp, H.M.R., *The Orchids of New South Wales* (Sydney 1943).

Stocker, G.C., "Aspects of Plant Physiology" Presented at the 8th Orchid Conference (September 1983).

Wallace, Dr. B., Notes taken from his lecture at the 8th Australian Orchid Conference.

Withner, C.L., *The Orchids Scientific Survey* (New York 1959).

Withner, C.L., *The Orchids Scientific Studies (New York 1974).*

2 Bluegum St.,
Normanhurst 2076.

Postscript to 'The Orchids of Norfolk Island'

P.S. Green

This article, published in the Orchadian Vol. 8 No. 8, has appeared in June issue of the Orchid Review with a postscript amending two of the orchids' names. It has been found that the plant described as *Phreatia tahitensis* is in fact *P. pileata* Reichb.f., a species occurring in New Caledonia and Vanuatu and perhaps further north. The *Taeniophyllum* mentioned does appear likely to be *T. muelleri* Lindl. ex Benth. and will be treated as such in the "Flora of Norfolk and Lord Howe Islands".

Editor

Corybas cryptanthus Hatch

Reprinted from Cooper's Group Newsletter #7 September 1983 p. 3.

by E.D. Hatch

In order to understand *Corybas cryptanthus* it is necessary to know something about the development of the more normal *Corybas* species.

Corybas trilobus (Hook.f.) Reichb.f., since it comes into the story, will do as an example. In Auckland the *C. trilobus* tubers begin to sprout about August. The meristem soon branches, one rhizome running along the surface beneath the litter, another rising towards the light. The horizontal rhizome develops secondary branches which wander in all directions for several centimetres and eventually form terminal tubers (enlarged nodes). The size of the tubers, on which depends the size of the next season's plants, varies with the amount of organic matter and mycorrhizal fungi present in the surface litter. The vertical rhizome goes on to develop a leaf, which again varies with the size of the original tuber, the larger the tuber, the larger the leaf. Leaf size also affects the size of the new season's tubers, the greater area of chlorophyll exposed to the light, the more nourishment synthetised, and so until, after several season's growth, the tuber is large enough i.e. it has enough food stored, to produce a flower and the tall seeding peduncle. This elongation of the peduncle, which occurs also in *Chiloglottis,* assists in dispersing the seed over a wider area than would be possible from ground level. The new tubers produced by a flowering/seeding plant are usually small, and the build-up cycle begins all over again. In Auckland the flowering plants begin to show in June, followed in August by masses of leaf-only plants, so that until the end of the season a colony will present a mat of green, soil-hugging leaves, scattered through with a much smaller number of seeding peduncles. When *C. cryptanthus* is also present, its peduncles are only distinguishable by a few red flecks on the stem and the absence of a leaf. Not surprising that it is overlooked! In the Atuanui State Forest I have also seen *C. trilobus* growing with *Yoania australis* Hatch, so that the uninitiated could quite easily assume that the leafless *Yoania* flower-stems belonged to the flowerless leaves of the *Corybas*. So much for *C. trilobus*.

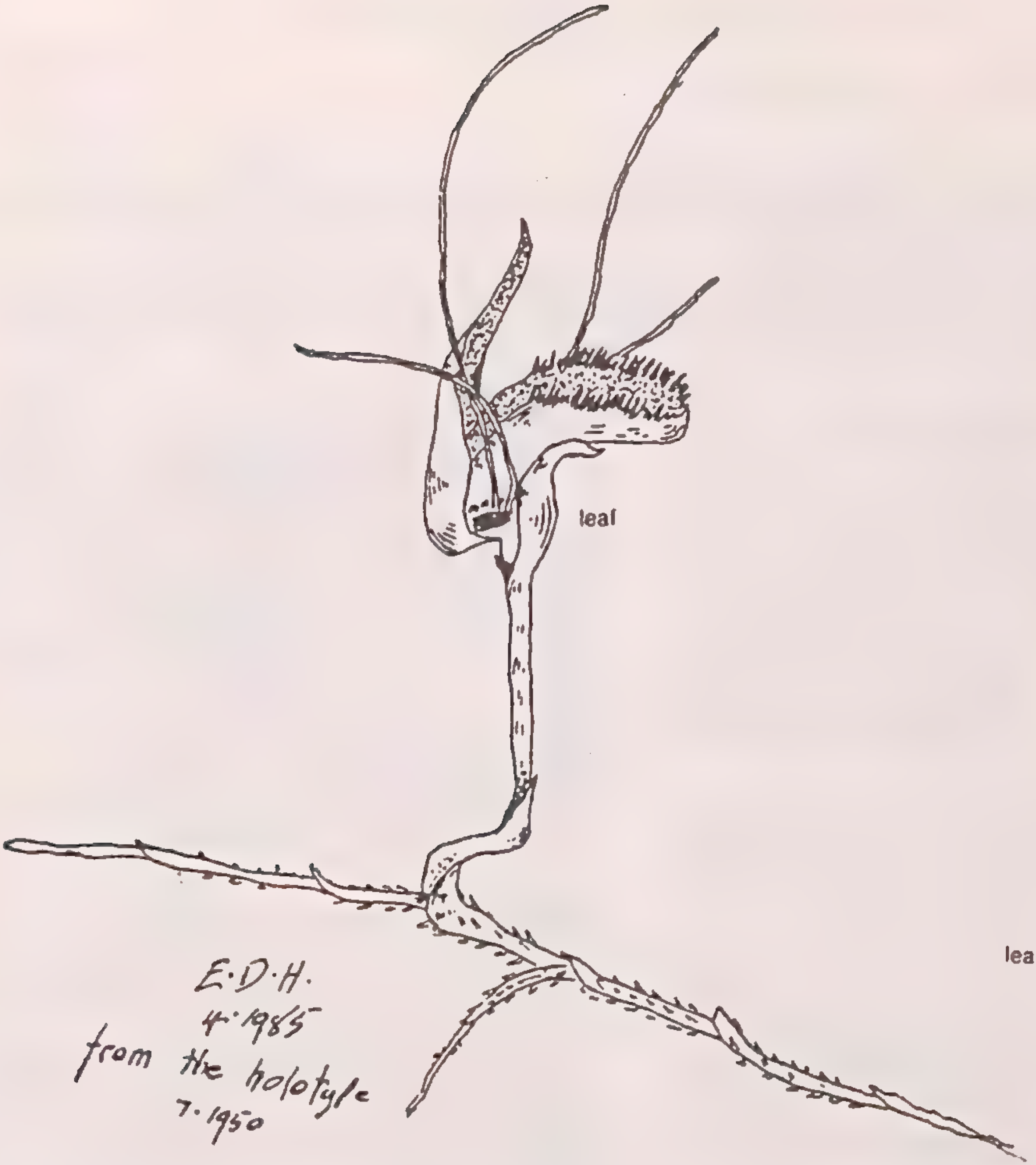
Corybas cryptanthus — It will be obvious from the above that the chlorophyll in the green leaf provides nourishment for the tubers to store, and that the tubers, (a) tide the plant over the dry/cold season and (b) provide a means of vegetative increase. In the epiparasitic group, *Yoania, Gastrodia* and *Corybas cryptanthus* in New Zealand, nourishment is obtained from fungi which are themselves parasitic on host plants. *C. cryptanthus* then, lives on the beech (*Nothofagus solandri* (Hook.f.) Oerst.), and manuka (*Leptospermum scoparium* J.R. & G. Forst.) at second hand, much as we could be said to live on grass, by eating the animals which use it for food. The chlorophyll, now no longer necessary, disappears from the plant and the leaf becomes redundant and shrinks to a mere bract which sheaths the flower in the bud. The rhizome being perennial, the tubers are reduced to tiny globules in the axils of the bracts. The plant lives in areas which are more or less damp throughout the year. In the event of the substrate drying out, which it sometimes does, tubers are formed. Vegetative reproduction is achieved by the plant growing and branching ahead and dying away behind. When the point of dissolution reaches a fork the branch rhizome becomes a separate plant.

Corybas cryptanthus was first found by William Colenso in a *Nothofagus* forest near Norsewood in 1880. It was growing among *C. trilobus* and this confused Colenso considerably. In Trans.N.Z.Inst. 16:1884.p 336, he described (as *Corysanthes hypogaea* = underground) a composite plant with the green leaves and green-and-red flowers of *C. trilobus,* and the underground flowering habit of *C. cryptanthus.* This description is so nearly that of *C. trilobus* that it is treated as a synonym. (see also Flora of N.Z. 2:1970.p 120).

There is no further record of *C. cryptanthus* until September 1924, when Mrs. E.A. Hodgson found it at Hendley in northern Hawkes Bay (A.P. Druce Welt.Bot.Soc.Bull. 26:January 1953.p 19).

Between January and March 1934 K.W. Allison collected plants from 3 localities on the Napier road, from Taupo to Opepe, and placed specimens in the herbarium at Auckland (Hatch Trans.Roy.Soc.N.Z.Bot. 2:1963.p 188).

On 25 October 1949, Bruce Irwin and Owen Gibson were returning to New Plymouth from a holiday in the far north and stopped near Wellsford for lunch (Irwin Welt.Bot.Soc.Bull. 23:September 1950.p 23); (Hatch N.Z.Gardener September 1951.p 27). Here in manuka scrub



Owen found a most unusual colony of seeding *Corybas* which lacked leaves, tubers and chlorophyll, and yet appeared to be thriving. Late in the evening of the same day they brought me specimens and sketches.

In December 1949 Bruce Irwin found 3 seeding plants growing with *Corybas trilobus* under beech in the Waitotara valley near Wanganui.

On 5 June 1950, Bruce Irwin and I, with Frank Bartlett of Silverdale, went to Wellsford and after a little trouble found the handkerchief which marked the spot. The tree to which it had been tied had blown over. Of the original colony there was no trace, (perhaps the digging around had upset the delicate balance of the association) but after some search we found 2 plants in early bud.

On 29 July 1950 Bartlett and I went again to Wellsford and this time our persistence was rewarded by a single plant in full flower, which I described (Trans.Roy.Soc.N.Z. 79:1952.p 366.t 71) as *Corybas saprophyticus.* Alick Dockrill was quick to point out to me that this name had been used by Schlechter for a quite different species of *Corybas* from New Guinea in 1911, and in Trans.Roy.Soc. 83:1956.p 577, I renamed it *Corybas cryptanthus* = hidden flower.

It has since popped up all over the place, usually being sat on for lunch, mainly under *Nothofagus solandri*, but sometimes with *Leptospermum scoparium.*

Footnote: This paper should be read in conjunction with — Hatch — Notes on the structure and development of the terrestrial orchids — Orchadian September 1971 p.10, Campbell E.O. — The morphology of the fungal association of *Corybas cryptanthus* — Journ.Roy.Soc.N.Z. 2:1972.p 43.

25 Tane Road,
Laingholm,
Auckland 7
New Zealand

Corybas rivularis — 'The Wet One'

by E.D. Hatch

Reprinted from Auckland Bot. Soc. Newsletter Jan. 1986.

Prelude

On 27 July 1983, Mark Clements wrote from Kew to Dorothy Cooper, telling her that he had found among other things, in the Lindley Herbarium, the type material of Cunningham's *Acianthus rivularis*. Item 3 of his letter read —

> **'... *Corybas rivularis* is without doubt the correct name for the plant known as *C. orbiculatus*. This leaves the species previously interpreted as *C. rivularis* without a name. I suggest that this be named as soon as possible'.**

Mrs Cooper passed this letter on to me. I was not even surprised. For years I had wondered by *Corybas rivularis* was so often to be found in cloud forest on high ridges, miles from the nearest stream, massed on mossed logs, clustering a couple of metres up the trunks of old tree ferns or clinging to trackside embankments. Over the same years I had several times commented on the aquatic tendencies of *C. orbiculatus*, and I was relieved to find that *rivularis* (as its name implied) was after all 'the wet one'.

After looking into the literature and searching the Cheeseman Herbarium and the Index Kewensis, I wrote to Mr Clements suggesting that the orphan be named (from the shape of the mature leaf) *Corybas acuminatus*. On 24 February 1984 I received from Kew a photograph of the Isotype of *Acianthus rivularis*, which confirmed Clements opinion that Cunningham's species was identical with *Corybas orbiculatus*. The nameless species was eventually redescribed as *Corybas acuminatus* M. Clements and Hatch (1985).

Account of the misinterpretation of *Corybas rivularis*.

1826: On 6 November Allan Cunningham found an orchid — '... growing among moss upon rocks in the bed of a briskly running rivulet, flowing through a deep shaded ravine near Wangaroa . . .' 1837.
He gathered flowering specimens (one of which had a pandurate leaf) and took them back with him to Sydney.

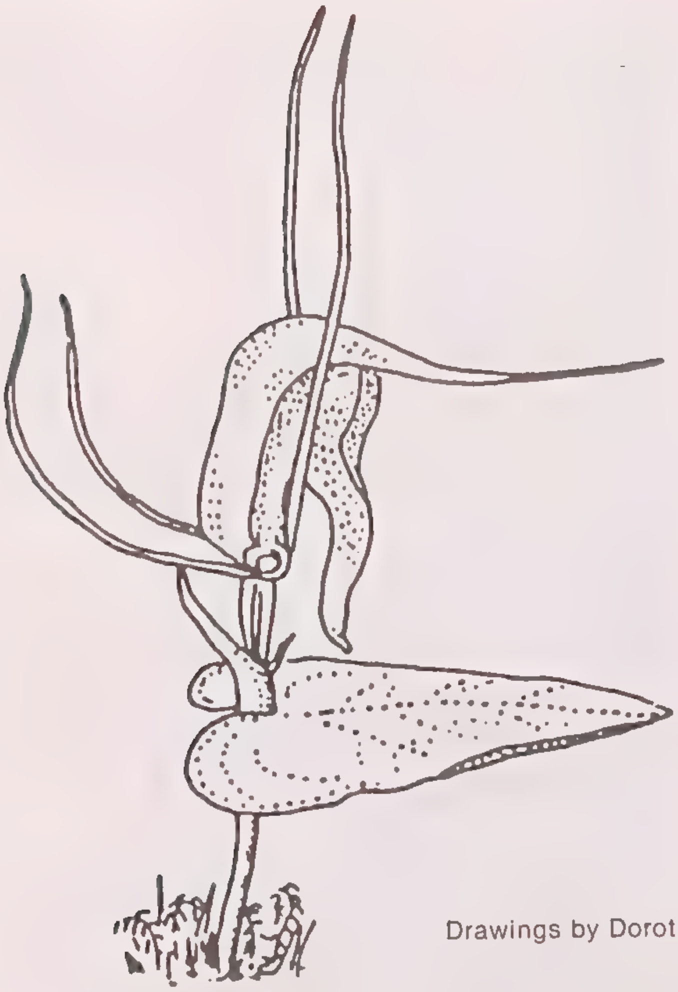
1837: In the Precursor (1837) he described these specimens as *Acianthus rivularis*.(= pertaining to streams). He recorded the petals and lateral sepals as of equal length, filiform and extremely long, and the labellum as cordate-acuminate with very thin, crenulate margins but did not mention the leaf or the dorsal sepal at all. Nor did he give any illustrations of his new species. These omissions caused the subsequent misinterpretation; for while *rivularis* and *acuminatus* both have long filiform petals and lateral sepals, the orbicular-apiculate leaf and acuminate dorsal sepal of *rivularis* are distinctly different from the ovate-acuminate leaf and filiform-caudate dorsal sepal of *acuminatus*. It is also possible that Cunningham's use of the name *Acianthus* added to the confusion, for the mature leaf-shape of *acuminatus* is superficially similar to that of *Acianthus fornicatus* var. *sinclairii*.

1838: In a letter dated 4 December Cunningham asked Colenso if he had found —
'... my little darling, the subaqueous *Acianthus* of the great falls of Keri Keri and Wangaroa'. 1948.

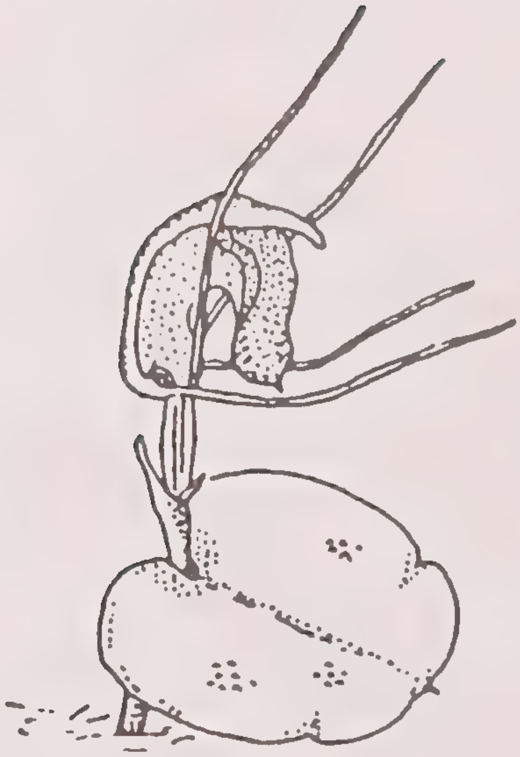
1844 - 1864: J.D. Hooker listed *rivularis* under *Acianthus* in 1844; under *Nematoceras* in 1853; and under *Corysanthes* in 1864; and it is probable that in one or more of these accounts he was mixing *rivularis* and *acuminatus* together. Only a careful study of the material preserved in the Hooker Herbarium at Kew will decide how many species were in fact involved. What is certain is that Thomas Kirk, in July 1864 (WELT 18877) and again in December 1866 (WELT 18879) collected *rivularis* sens. orig. from a waterfall at Great Omaha, near Leigh, and determined it as *Corysanthes rotundifolia*.

1867: Having unwittingly disposed of Cunningham's species Kirk looked round for something to call *rivularis* and found it in December 1867 (WELT 18901) on the Great Barrier Island. His specimens are *Corybas acuminatus*.

1872: In his Botany of the Titirangi District etc. (1872) Cheeseman recorded *Corysanthes rotundifolia* with a question mark. His voucher sheet (AK 3653) is labelled *'Corysanthes* ... Titirangi, Oct. 1870 TFC'. The specimens are *rivularis* sens. orig. A further collection from the same locality (AK 3652) is labelled *'Corysanthes rotundifolia* Titirangi, October 1873 TFC', and several pandurate-leaved specimens are marked var. *pandurata* which however he



Corybas acuminatus (formerly **C. rivularis**)



Corybas rivularis (formerly **C. orbiculatus**)

Drawings by Dorothy Cooper.

did not describe until 1925. In his Titirangi paper (1872) Cheeseman also listed *Corysanthes rivularis.* The voucher specimens for this (AK 3644) are in fact *Corybas acuminatus.* These errors, by whom and however they originated, were 'fixed' by Cheeseman in 1906 and the rest is taxonomic history (1970).

References

Bagnall A.G. & G.C. Petersen
1948: *William Colenso* p. 74

Cheeseman T.F.
1872: *Trans. NZ Inst.* 4:p 279
1906: *Manual NZ Flora* Ed 1.p 694
1925: *Manual NZ Flora* Ed 2.p 366

Clements M.A. & E.D. Hatch
1985: *NZ Journ.Botany* 23:(3)p 491

Cunningham A.
1837: *Florae insularum NZ precursor* Companion Bot. Mag. 2:p 376

Hooker J.D.
1844: *Flora Antarctica* 1:p 71
1853: *Flora NZ* 1:p 251
1864: *Handbook NZ Flora* 1:p 266

Moore L.B. & E. Edgar
1970: *Flora NZ* 2:p 118. fig 24

I am indebted to Mr Anthony Wright and Dr P.J. Brownsey for help in searching the early collections of Cheeseman and Thomas Kirk.

25 Tane Rd.,
Laingholm
Auckland 7,
New Zealand

Mona Vale Spring Show 1986

by M. McTiernan

The twelfth annual spring show of the Warringah group of ANOS was held over the weekend of 6 & 7 September 1986 at Mona Vale.

Attendance at this year's show was a little down on previous years probably because of two factors. Firstly the show coincided with Father's Day, and secondly at that time Sydney was subject to one of its petrol strikes. Nevertheless the weather was fine and a great display of quality plants was benched.

Being at this show is, for me, the highlight of the orchid grower's year. Much may be learnt listening and talking to others about a whole range of subjects ranging from cultivation to hybridising. By mid-morning the perfume in the hall becomes overwhelming. This is the time when stories of 'that fabulous "kingie" that was not quite ready for the show' begin to flow. Who could blame anyone for stretching the ruler in this euphoric situation?

Benching takes place on the day before the show opens. During the afternoon those present may obsrve the steadily growing number of exhibits being displayed. In the late afternoon Mr Eric Webeck arrived. Word quickly went around the hall that he had not brought the giant *Dendrobium* X *delicatum* with which he has in the past won the Champion Specimen Native Orchid Hybrid prize on so many occasions. Hopes rose amongst some that they may now have a chance to wrest this medal from Eric.

Well the rumour was correct. Eric had brought one of his smaller 'dellies'. This plant only carried 97 racemes with up to 25 flowers each and of good quality too! Needless to say, Eric again won this prize. I asked Eric what had happened to the grandfather plant which we had seen in the past. His reply was that it had been attacked by large witchetty grubs which had apparently entered through the drainage holes and eaten right up into the centre of the newer canes. He reports that the plant has now been repotted and should be back in top condition next year.

Eric's plants were attacked from above and below this season. I was inspecting a particularly fine *Dendrobium* Bardo Rose which he had benched in the class 'Best *Dendrobium* Hybrid with *D. kingianum* parentage excluding *D.* X *delicatum'* and reflecting that had the plant displayed more than its single raceme, it may have been more closely considered by the judges for first prize instead of the second placing actually awarded. Eric then remarked that the plant had originally carried about eight spikes but only one had been left after an attack by a particularly hungry insect.

That class was actually won by a plant of *Dendrobium* Aussie Bonanza. This was a fine plant in itself but with only 12.5% *D. kingianum* in its parentage it was difficult to see the influence of that species in this hybrid. How far can this go and still leave meaning in this class? What about 6.25% *D. kingianum*? I feel that the show committee should carefully consider the definition of this class for future shows.

This display of terrestrial orchids continued its growth this year and is becoming quite a feature of the show. Many visitors find this section the most fascinating of all. The class 'Best Hybrid Seedling — first flowering' attracted nineteen entries. I find this keenly contested class very interesting as it closely reflects current trends in hybridising.

In the 'Large Display' class, the first prize was awarded to those fine hybridists W. & J. Upton who also took out many other awards. Second prize in the 'Large Display' was awarded to Wollongong group of ANOS.

Winners of championship prizes were as follows:—

Class	Plant	Owner
Epiphytic Species	*Dendrobium tetragonum*	S. Batchelor
Terrestrial Species	*Pterostylis baptistii*	R. & L. King
Hybrid	*Dendrobium* Hilda Poxon	W. & J. Upton
Species Specimen	*Dendrobium teretifolium*	L. Montuoro
Hybrid Specimen	*Dendrobium* X *delicatum*	E. Webeck

Once again congratulations are due to the show committee led by Mr Chris Arnott and all those who assisted in making this show the success that it was. The contribution of other ANOS groups particularly Central Coast, Wollongong and Sydney was greatly appreciated.

See you at Mona Vale in 1987!

19 Sept 1986

10 Cameron Ave.,
Artarmon.

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Pterostylis laxa

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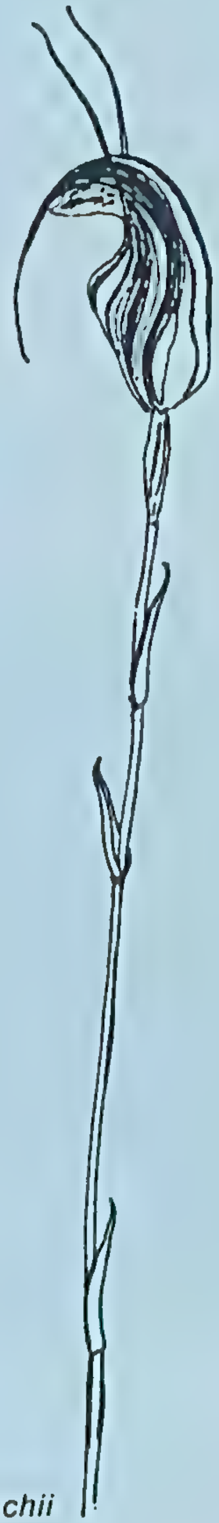

Pterostylis fischii

Drawings by W. T. Upton.

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ORCHIDS OF THE CAPE YORK AREA

Cape York from Mt Bremer with York Island in the background.

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Orchids of the Cape York Area

by Dr P. S. Lavarack

The results of the joint Australian Orchid Foundation — Queensland National Parks and Wildlife Service Expedition to the Cape York area of Cape York Peninsula.

Introduction

Most of the results presented here were gathered on an expedition to the Bamaga area held in February 1986 and supported by the A.O.F. Other information was obtained on several expeditions held for a variety of purposes by Q.NPWS and CSIRO, Atherton.

The A.O.F. expedition stayed at Air Queensland's 'Top of Australia Wilderness Lodge' and spent several days exploring the area south to the Jardine River. Members were Dr P. S. Lavarack, botanist with Q.NPWS; Mr B. Gray of Atherton; Mr D. L. Jones, Chairman of the Research Committee of the A.O.F. Mr D. Wilson, a photographer of Townsville, was also present.

The Study Area

The area studied comprises that part of Cape York Peninsula north of the Jardine River. Much of the area is taken up by the Carnegie Tableland, a low, relatively flat sandstone plateau. The highest point is 145m at Peak Hill but average heights are around 40-80m. The relatively flat Newcastle Bay dunefield lies to the east and a large area of mangroves fills the estuaries of Jacky Jacky Creek and the Escape River.

Perhaps the outstanding physical feature of the area is the Jardine River, an imposing stream 120m wide and fast flowing all year round.

Rainfall in the study area is quite high with an annual average of 1764mm at Bamaga. It is reliable but strongly seasonal with averages of 11, 6, 8 and 14mm for July, August, September and October respectively.

Temperatures in the study area are affected by the close proximity to the sea and are more equitable than many other areas of the Peninsula.

Vegetation

A large part of the study area is covered with a dense well developed rainforest which features large trees such as *Syzygium bamagense, Ficus albipila, Acmenospermum claviflorum* and *Alstonia scholaris*. Palms such as *Gulubia costata* and *Caryota rumphiana* are prominent. This type covers virtually all the Carnegie Tableland and supports many orchids and other epiphytes.

To the east of the tableland is an extensive dune system covered in a complex mosaic of notophyll vine forest, open forest and heath. Orchids are not abundant here.

On the western and northern foreshores are narrow bands of parallel dunes alternating with fresh or brackish swales. They are covered with low closed forest or shrubland alternating with bare areas. Common species include *Manilkara kauki, Mimusops elengi* and *Pongamia pinnata*. These scrubs are a prime habitat of the Cooktown Orchid.

The lowlands between Bamaga and Cape York feature a mixed open forest in which eucalypts, wattles, paperbarks and several other species mix together. Terrestrial orchids are a feature in the wet season.

The rocky ridges near Cape York and Peak Hill support an interesting open forest in which the outstanding tree is *Welchiodendron longivalve*. This small tree is an outstanding host for epiphytes.

Mid height to tall open forest comprising *Eucalyptus tetrodonta, E. nesophila* and *Erythrophleum chlorostachys* with a dense ground layer of tall grass covers much of the area south of Bamaga.

Small areas of heath occur south of Bamaga, forming the northern extension of the extensive heathlands south of the Jardine.

A feature of the vegetation is the seasonality of many of the communities. While the main rainforest area retains most of its canopy cover throughout the year, this is not true of many pockets of monsoon forest on rainforest margins and on steep rocky slopes. In areas such as these many of the larger species are deciduous and a closed forest of February can become an open forest by September. It is not only in the canopy that these changes occur. Almost all of the prolific herbaceous cover of the wet season is absent in September, having retreated to an underground tuber or rhizome. Plants in this category include the extremely abundant Cape York Lily (*Curcuma australasica*), *Tacca leontopetaloides, Eurycles amboinensis, Amorphophallus galbra* and several species of *Typhonium*. The only dry season indication of the presence of these attractive and interesting plants is usually a few dried leaves. *Malaxis marsupichila* has the same growth habit losing its leaves in the dry season, when the small pseudobulbs are covered by fallen leaves and the plants become virtually unfindable. This contrasts with the wet season situation of abundant large patches of this species on the forest floor.

History

The study area is rich in history. It was probably the first land sighted by the early Dutch, Portuguese and Spanish explorers such as Willem Janz in the "Duyfken" in 1606 and Torres later in the same year. James Cook sailed through Torres Strait in 1770 landing on Possession Island. The sad and heroic climax of the Kennedy expedition was played out here in 1848.

Botanical history began with J. Beete Jukes on the "Fly" in 1845 and John MacGillivray on the "Rattlesnake" in 1847-49.

Following on these expeditions came the establishment of the settlement of Somerset. During the 1880's and later, Somerset became a base for many prominent biologists who were encouraged by Frank Jardine. One of these was the colourful Italian Luigi D'Albertis whose main preoccupation was collection of Birds of Paradise in New Guinea. *Dendrobium dalbertisii* was named after him.

Very early in the history of Somerset it appears likely that the noted plant collector John G. Veitch was at Somerset or the near vicinity as he collected plants of a *Dendrobium* subsequently named *D. johannis* by H. G. Reichenbach (Bateman, 1865). Veitch travelled to Australia in 1864 and would probably have called in at Somerset or Evans Bay where *D. johannis* is abundant. The type locality of this species may never be known with certainty but it seems probably it was Somerset or nearby.

Mrs Ellis Rowan, well known for her flower paintings, visited Somerset in 1891 (Rowan, 1898). She made one notable orchid collection. This was a *Bromheadia* subsequently shown to be *B. pulchra*, the first collection of this genus in Australia (Ewart, 1907). A truly beautiful legacy of her visit is the painting of *Dendrobium bigibbum* and *D. bifalce* in the National Gallery at Canberra.

F.M. Bailey, the Colonial Botanist visited Thursday Island and Somerset in June, 1897. The only orchid Bailey makes mention of is *D. bigibbum* on which he comments:

> 'The beautiful orchids for which these islands used to be favoured are fast disappearing, at least from anywhere easy of approach from Thursday Island — such is the case with regard to the varieties of *Dendrobium bigibbum* Lindl. which are the kind most sought after.'

Diary of Expedition

February 10th. The party flew via an Air Queensland DC-3 from Cairns to Bamaga.

February 11th. The weather was hot and humid after a surprisingly cool night. Isolated heavy showers were around but basically the weather remained fine.

The country covered was mostly mixed forest with some swampy ground and some rocky outcrops covered with *Welchiodendron longivalve.* Although much country apparently well suited to terrestrials was inspected only a few species were seen. The only *Habenaria* seen was *H. ferdinandii* which occurred scattered in several different habitats. A species of *Nervilia* with peltate leaves was found to be abundant although no flowers were seen. It appears likely that this is an undescribed species also occurring in the Northern Territory. Live plants were collected in the hope that they can be induced to flower in cultivation.

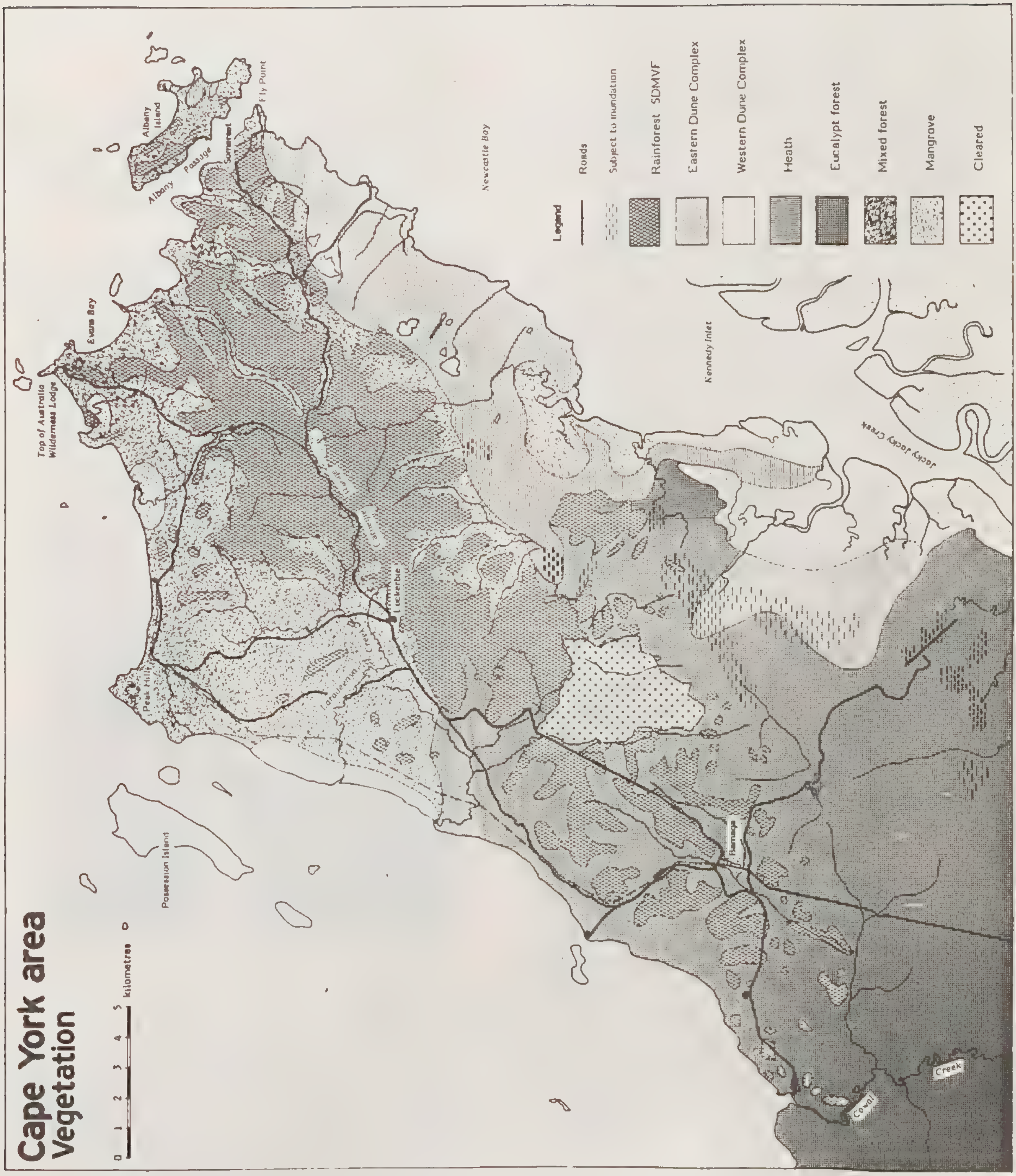
Several specimens of a small *Calochilus* were found on a swampy flat beside a creek. From the remains of the flowers it appeared that this species which produces only 1-4 flowers is conspecific with an undescribed species from the Northern Territory. Other species seen were: *Nervilia holochila* (leaves only), *Calochilus caerulus* (spent flowers and capsules only), *Geodorum densiflorum, Arthrochilus* sp. possibly *A. irritabilis.*

On rocky knolls where *Welchiodendron longivalve* is the predominant tree several orchids were seen. *Diplocaulobium glabrum* was particularly common along with *Dendrobium discolor, D. bigibbum, D. johannis, D. smillieae, D. rigidum, Eria fitzalani, Bulbophyllum baileyi* and *Luisia teretifolia.*

After returning to camp several large flowering colonies of *Malaxis marsupichila* were found growing in leaf litter in scrub near the beach.

February 12th. On this day the party walked west from Cape York along the beach to Crocodile Creek. The dunes behind the beach carried patches of vine forest alternating with shrubland. The Cooktown orchid (*Dendrobium bigibbum* var. *bigibbum*) was abundant along with *D. discolor, D. rigidum* and *D. semifuscum.*

In moister areas *Habenaria ferdinandii* was abundant. Some flowering plants of the small *Calochilus* were located confirming that these


Cape York area
Vegetation
0 1 2 3 4 5 kilometres
Legend
Roads
Subject to inundation
Rainforest SDMVF
Eastern Dune Complex
Western Dune Complex
Heath
Eucalypt forest
Mixed forest
Mangrove
Cleared
Albany Island
Albany Passage
Somerset
Fly Point
Newcastle Bay
Evans Bay
Top of Australia Wilderness Lodge
Kennedy Inlet
Jacky Jacky Creek
Lockerbie
Laradeenya Creek
Peak Hill
Possession Island
Bamaga
Cowal
Creek

are in fact the same as the Northern Territory species and distinct from *C. caerulus.* This species produces a few flowers and these last only a day or two so the collector has to be on the right spot at the right time. The leaves appear to come up after the flowers. *C. caerulus* produces the leaves before the flowers.

February 13th. "Lockerbie Scrub" area. On this day the party was driven to a point near the old Lockerbie homestead and worked through the rainforest area. This was the one day on which heavy rain caused some problems.

A major aim of this day was to look for specimens of a *Taeniophyllum* collected on a previous trip by Bruce Gary and which appears to be either a new species or a new record for Australia. Many branches were pulled down from trees on the edge of the rainforest and a few specimens, including one large plant, were collected. Other species seen included *Dendrobium bifalce* which was abundant and the following: *Dendrobium smillieae, D. johannis, Chiloschista phyllorrhiza, Pholidota pallida, Bulbophyllum baileyi.*

February 14th. On St Valentines day the party attempted what proved an overly ambitious walk from the road near the Lake Bronto turnoff to Muddy Bay, the Mew River and thence to Evans Bay and Cape York. However the swamps on Barnia Creek proved impenetrable and resulted in a long weary march back along the road.

On the way to the drop off point some plants of *Pomatocalpa macphersoni* were collected on a fallen tree while it was being removed from the road. On the walk some plants of *Malaxis latifolia* and *M. marsupichila* were collected along with a flowering *Arthrochilus* which may turn out to be a new species or possibly a form of *A. irritabilis. Geodorum* was also seen.

February 15th. Air Queensland provided a vehicle to travel to the Jardine River area. After calling at Bamaga hospital for treatment for various rashes and blisters, the group proceeded to a creek locally known as the "The Cyprus Hole". The road passed through an extensive heath swamp in which pitcher plants were common along with *Habenaria ferdinandii.* In shrubland on the margin of this swamp, leaves of an *Arthrochilus* were found and, after a long hunt, a flowering specimen. This was at first thought to be *A. dockrillii,* but subsequent investigations by Dave Jones have showed it to be an undescribed species.

Nearby was an extensive area of epacrid scrub and in this the following orchids were noted: *Dendrobium johannis, D. smillieae, D. rigidum, Bulbophyllum baileyi* and *Pholidota pallida.*

February 16th. On this day, thanks to the generosity of a local family, Mr Ivan Vella and his wife Rae, an extensive tour was undertaken of the northern part of the Cape.

Several interesting localities were visited. The outstanding discovery was a large colony of the rare *Habenaria elongata* growing in full sun in short grass on an exposed headland at Fly Point. Later other plants of this species were found in open forest near Laradeenya Creek.

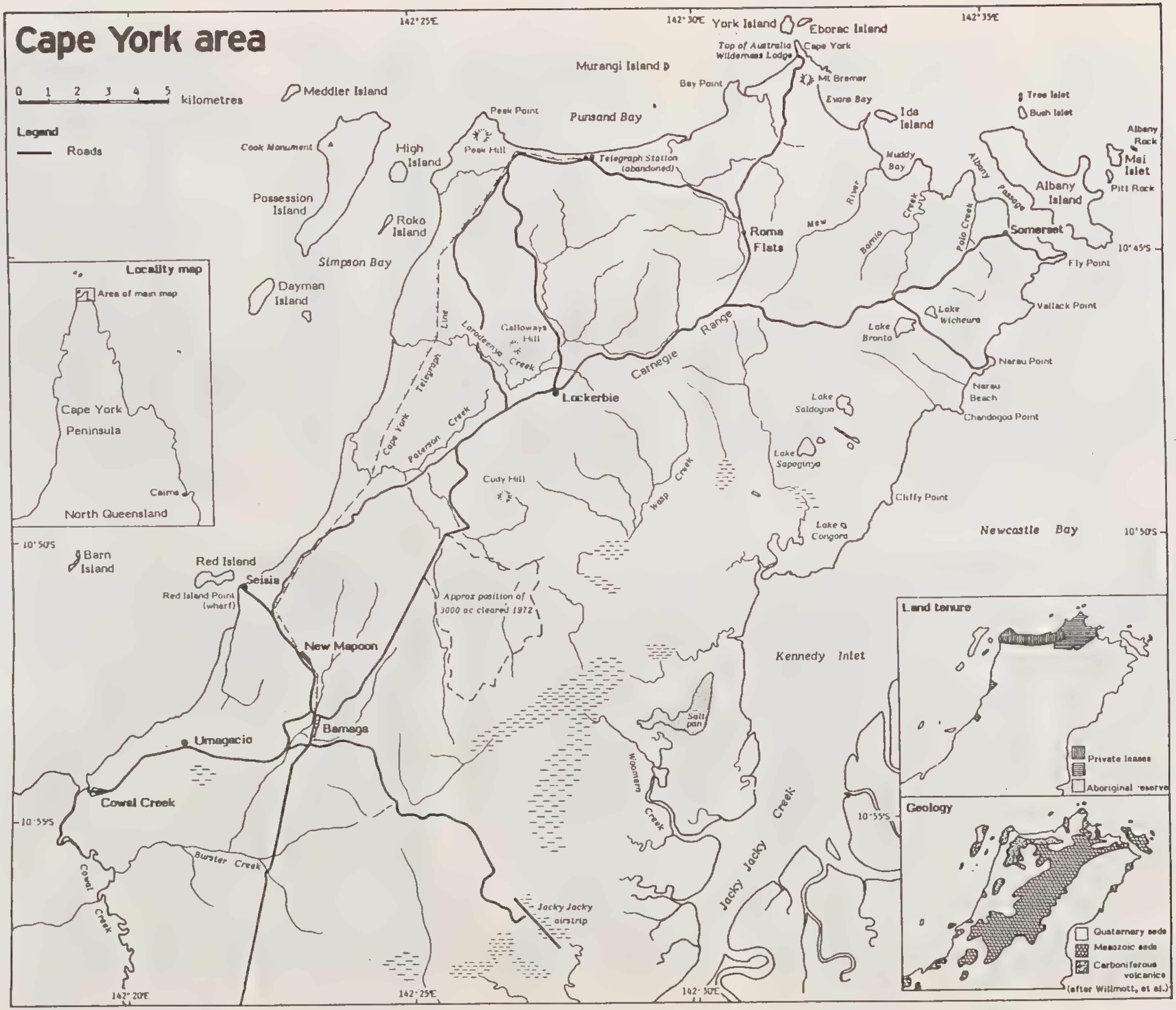
February 17th. On this day Bill Lavarack and Dave Wilson did a short walk to Evans Bay and return around the back of Mt Brewer. This led through some interesting rocky country which featured some very large plants of *Dendrobium johannis* again growing in *Welchiodendron longivalve* trees.

Habenaria elongata

Discussion

The Significance of the Study Area. In Appendix 1, 36 species are recorded in the study area. Thus in comparison with other parts of Cape York Peninsula, these areas are somewhat richer than the Carron Valley area (25 species), but considerably behind the McIlwraith Range (90+) and the Iron Range area (70+). (See reports by Lavarack 1984, 1980, 1977c).

The Bamaga area represents one end of a chain of moister habitats which extend along the east coast fringe from cape York to the



Cape York area

southern end of the McIlwraith Range. The study area is probably moister than much of the east coast, but it clearly lacks the very high rainfall of the Iron Range and McIlwraith Range areas. It also lacks the altitudinal range of these areas and consequently has fewer different habitats available for orchids. It is, however, richer in species than most of the Peninsula.

There is little doubt that the seasonal climate reduces the number of niches available to various orchids. It is tempting, when visiting the area in the wet season, to imagine that conditions are moist all year, but the rainfall figures clearly show this is not the case. Many of the moist, shaded environments of February become dry and dusty with no leaf cover in September. Thus species such as *Vanda hindsii, Phalaenopsis amabilis* and *Dendrobium antennatum* are missing from the Bamaga area although relatively common in New Guinea and at Iron Range.

The Bamaga area does not show any evidence of links to New Guinea stronger than those for other areas such as Iron Range. Any species of supposed New Guinea origin which have reached Bamaga have also reached Iron Range and often further south.

There are considerable links to the west with the Top End of the Northern Territory. Some of these links remain to be fully clarified and the current work by David Jones should do this. Species such as the unidentified *Nervilia* and the unidentified *Calochilus* are significant in this regard.

Conservation There is very little security for orchids and their habitats north of the Jardine River. Most of this area is Aboriginal and Islander Reserve and could conceivably be cleared if the local inhabitants so desired. Previous attempts at clearing and pasture growing have proved unsuccessful with regrowth of weeds being the end result.

The benefits likely to accrue from clearing for grazing are small compared to the potential benefits from tourism if the area is left substantially intact.

Steps may need to be taken to prevent the removal of plants, in particular Cooktown Orchids, from the bush. These orchids have been heavily collected for about 100 years and are now depleted on many of the islands. Good populations still remain on the mainland in several areas, but increased accessibility due to the increased ownership of four wheel drive vehicles is now resulting in steady collecting pressure on these plants. If a way can be found to allow access to tourists while ensuring that plants are not removed, they could become a great tourist attraction.

Strict control on the sale of these plants will help prevent commercial collecting, but removal of small numbers for private use is now a significant problem. Perhaps Aboriginal Rangers could be used to police this. Certainly a publicity campaign is required to attempt to control private collecting.

Conclusion The epiphytic orchids of the study area could perhaps be described as "predictable". The terrestrials however offered some surprises. Some extremely valuable collections of *Calochilus, Nervilia* and *Arthrochilus* species were made. It would appear that undescribed species of all these genera occur here along with at least one undescribed *Taeniophyllum.*

The area is rich in fine forms of *Dendrobium bigibbum* and the natural hybrid *D. x. superbiens.* Other orchids are less spectacular but often make up for a lack of size by occurring in large numbers.

Acknowledgements

The expedition owes a great deal to the generosity and help of Air Queensland who provided accommodation and transport free of charge at Cape York. Special thanks in this regard are due to Paul Phelan and his staff at the "Top of Australia Wilderness Lodge" without whose help the expedition would have been very difficult.

Ivan and Rae Vella of Bamaga were also most helpful to the party members, going to some trouble to help make the expedition a success.

The members of the expedition would also like to thank the Directors of the Australian Orchid Foundation for their support.

Bibliography

Bailey, F. M., 1898. A few words on the flora of the islands of Torres Strait and the mainland about Somerset. *Report Aust. Assoc. Adv. Sci.* **7:** 423-447.

Bateman, J., 1865 *Dendrobium johannis.* Mr John G. Veitch's Dendrobe. *Curtis Bot. Mag.* **21:** Tab 5540.

Brass, L. J., 1953. Summary of the 1948 Cape York (Australia) Expedition. *Bull. Amer. Nat. Hist.* **102:** 141-205.

Ewart, A. J., 1907. New or rare plants in the National Herbarium, Melbourne. *Vic. Nat.* **24:** 13.

Lavarack, P. S., 1977 (a). Notes on Queensland Orchidaceae I. *Austrobaileya* **1** (l): 63-74.

1977(b). Some notes on orchids and other plants at Bamaga. *The Orchadian* **5**(7): 106-108.

1977(c). Orchids of the Iron Range Area. Unpublished report to the Aust. Orchid Foundation.

1980(a). Orchids of the McIlwraith Range. Unpublished report to the Aust. Orchid Foundation.

1980(b). Wet Season Orchids of the Iron Range Area. *The Orchadian* **6**(8): 171-173.

1984. Orchids of the Carron Valley area. Unpublished report to the Aust. Orchid Foundation.

Rowan, E., 1898. A Flower Hunter in Queensland and New Zealand. John Murray, London.

Appendix I

Orchids of the Northern Peninsula Area

Name	Habitat	Abundance
Arthrochilus irritabilis	3a,3b,4c	A
A. sp. aff. *dockrillii*	3b,3c	R
Bromheadia pulchra	3a	U
Bulbophyllum baileyi	1a,1b,3c	A
Calochilus caerulus	4b	R
Calochilus. sp	4b	R
Chiloschista phyllorrhiza	1a,4b,5	A
Dendrobium bifalce	1a	A
D. bigibbum	2b,4b	A
D. canaliculatum	4b,4c	U
D. discolor	1a,2a,2b	A
D. johannis	1a,3c,4b	A
D. lobbii	3a	R
D. rigidum	1a,2a, 2b,3c,4d	A
D. semifuscum	4c	A
D. smillieae	1a,3c,4b	A
D. stuartii	1a	R
D. X superbiens	2b	R
D. teretifolium	1a	R
Diplocaulobium glabrum	4b	A
Eria fitzalani	1a,3c,4b	A
Geodorum densiflorum	4a,4b	A
Habenaria elongata	4b	U
H. ferdinandii	4a,4b	A
H. ochroleuca	4a	R
Liparis habenarina	4a	R
Luisia teretifolia	1a,2a, 2b,3c,5	A
Malaxis latifolia	1a	U
M. marsupichila	1a	A
Nervilia holochila	4b	A
N. plicata	4b	R
Nervilia. sp.	4b	A
Pholidota pallida	1a,3c	A
Pomatocalpa macphersoni	1a	R
Taeniophyllum sp. aff. *glandulosum*	1a	R
Taeniophyllum sp.	1a	R

Key

Habitat

1a	Semi deciduous mesophyll vine forest
2a	Eastern dune complex
2b	Western dune complex
3a	Low open forest
3b	Tall closed heath
3c	Closed epacrid scrub
4a	*Eucalyptus tetrodonta* forest
4b	Mixed forest
4c	Paperbark forest
5	Mangroves

Abundance

A	abundant
R	restricted
U	widespread, but uncommon

Dr P. S. Lavarack

Dr P. S. Lavarack known to everyone as "Bill" was born in Melbourne in 1942. However he soon saw the light and moved to Queensland when he was nine. He completed a degree in science and PhD at Queensland University, and has since been employed by Queensland National Parks and Wildlife Service. He has lead several expeditions to Cape York Peninsula for the A.O.F. discovering and describing many new orchids. Along with Bruce Gray he is the author of "Tropical Orchids of Australia", and a member of the Research Committee of the A.O.F. Bill and his wife Bev and children Anthony, 9, and Belinda, 11, live in Townsville. His current work involves the preparation of a management plan for Hinchinbrook Island, while his spare time these days revolves around Little Athletics and training Belinda, who is State high jump champion.

Bulbophyllum hedyothyrsus Schlechter

by N. H. S. Howcroft

Although this orchid has been frequently encountered in the forests between 800 to 1,000 metres above sea level, people are rarely fortunate to see one flowering. Recently a Wau resident brought a flowering specimen to me for identification.

Since this was only the second flowering specimen I have seen, I decided it was a good opportunity to illustrate it before the flowers collapsed. The illustration in figure 1A shows the specimen as it was delivered to me, broken and apparently growing upside down on the branch or trunk of a felled tree, because the leaf and pseudobulb are normally in an approximate erect position like the inflorescence in figure 1A.

Bulbophyllum hedyothyrsus. Schltr. in Fedde Rep. Spec. nov regni veg. Beih. 1 : 881 (1913) et in Beih. 21 : Tafel cccxi, Fig. 1194 (1928).

Description: Epiphytic with very long rhizomes. *Pseudobulbs* up to 20cm apart, depressed — conic, unifoliate, up to 2cm tall and 3cm diameter. *Leaf* erect, elliptic — lanceolate, subacute with the base narrowing to a short petiole. up to 14 x 4.2cm, upper surface with a glossy, metallic-like green, the opposite side a dull purple. *Inflorescence* racemose, peduncle long thin and glabrous erect and arching, up to 45cm long, laxly 10-15 flowers; bracts recurved, lanceolate, acuminate. *Flowers* considered large for the section, glabrous; *dorsal sepal* lanceolate, acute, with two raised, rounded areas at base separated by a short ridge, 1.7-2.0 x 0.4-0.6cm. *Lateral sepals* united on the lower margin leaving short apices exposed, synsepalum ovate — elliptic, 3.2-3.7 x 1.8-2.0cm. *Petals* obliquely oblong; obtuse, 5 x 2.3mm. *Labellum* fleshy, curved, square at base to narrowly oblong, obtuse; margins with dense minute hairs, concave at base forming a semicircular callus, c. 4.5cm long. *Column* very short, column arms obliquely rhomboid, blunted; foot incurved. *Anther* reniform and hooded, smooth, obtusely apiculate. *Ovary* with pedicel, short, cylindrical and glabrous, 6-7mm long.

Distribution: Schlechter's type specimen No. 18497 was collected in the Bismark range at 1,000 metres in October 1908. The specimen illustrated here was collected in February 1987 from a logging area at ± 800 metres altitude behind the Manki range that overlooks the Bulolo Valley and township from the west. Sterile specimens have been seen in a number of private collections in the country and the species is considered to be widespread in Papua New Guinea.

Notes: One of four species placed in the section *Hedyothyrsus* Schltr. The others are *B. callichroma* Schltr., *B. chloranthum* Schltr and *B. calothyrsus* Schltr. The section is characterised by the long creeping rhizomes and the sub globose-conic to depressed conic pseudobulbs, with racemose inflorescences carrying flowers with united lateral lobes as found in the section *Cirrhopetalum.*

Schlechter reports the species of the section to be found as mist-forest epiphytes at altitudes between 600 to 1,000 metres; however I recently found in flower what I believe to be *B. chloranthum* Schltr., on trees along the banks of the Oriomo River in the Western Province, close to sea level.

B. hedyothrysus is unusual in its colouring, the lateral lobes of the labellum of the Bulolo specimen was maroon to brown and the dorsal sepal yellow. The labellum appeared flesh pink colour and the petals whitish with a maroon stripe.

I have had little success growing this species compared to others of the section. It required plenty of space to grow, either on live branches or trunks of trees or shrubs or alternatively a long slab of tree fern.

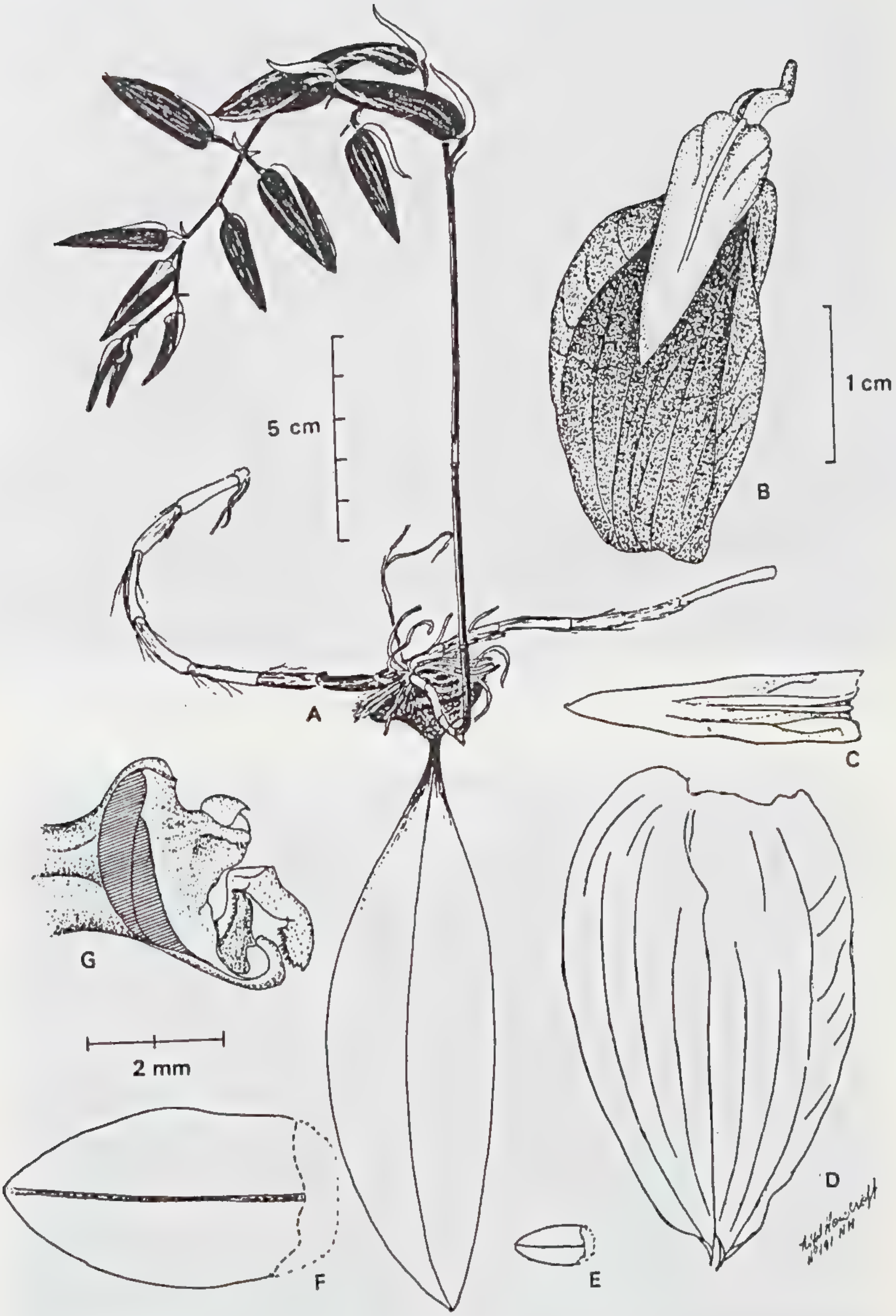
Acknowledgements I would like to thank Mr D. Beebee of Wau for providing me with flowering specimen which is illustrated here.

References

Schlechter (1911-1914) Die Orchidaceen Von Deutsch-Neu-Guinea Fedde, Repert. Beih. 1: 881-882 (German Version), 881-882 and 973 (English version).

13 March 1987

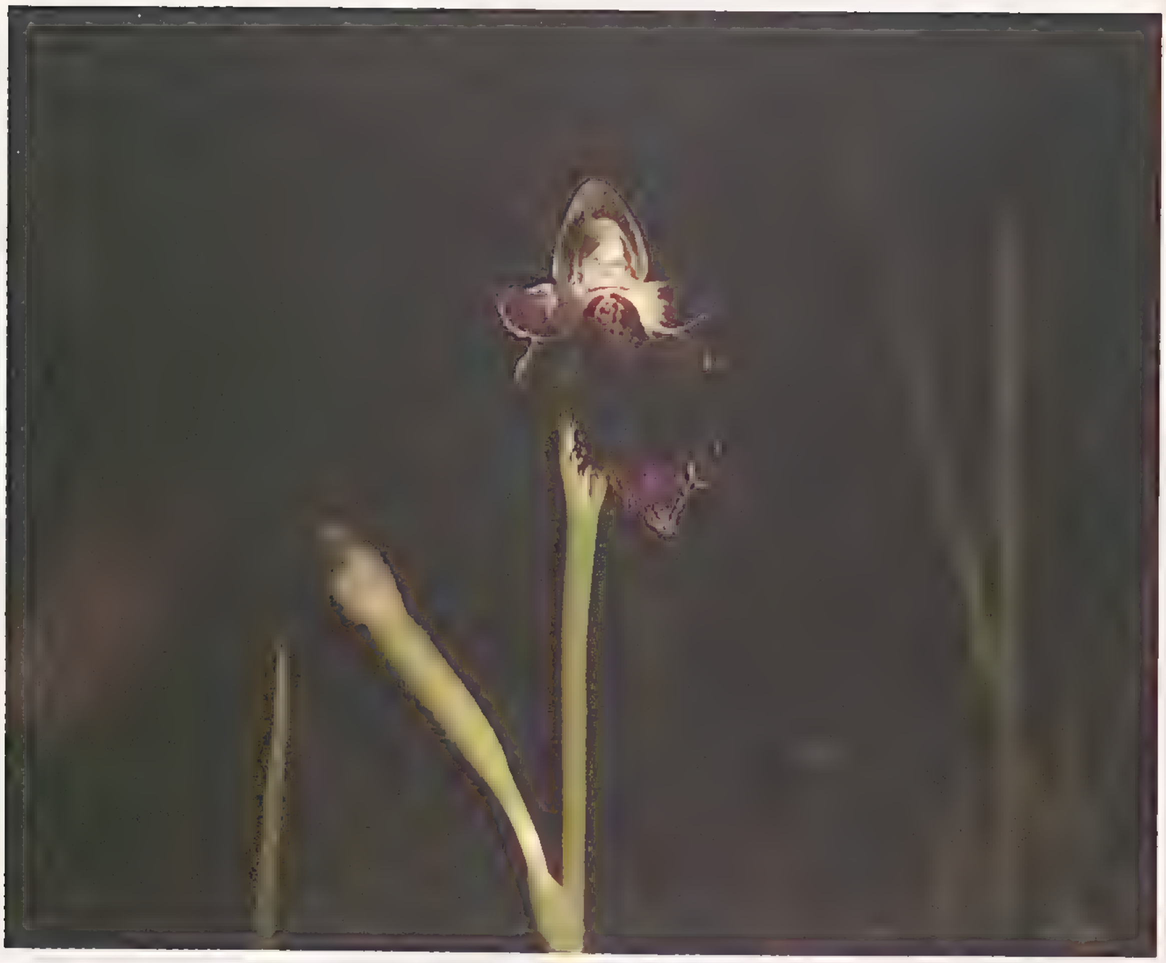
Forest Research Station
P.O. Box 134
Bulolo



Drawings by N. H. S. Howcroft.

Bulbophyllum hedyothyrsus **Schltr.**

Fig. 1 A. Plant habit and inflorescence. B. Flower, front view. C. Dorsal sepal D. Lateral sepals E. Petal, to scale of B to D. F. Petal enlarged G. Column and labellum, lateral view, scale as for F (C-G fresh spirit material).

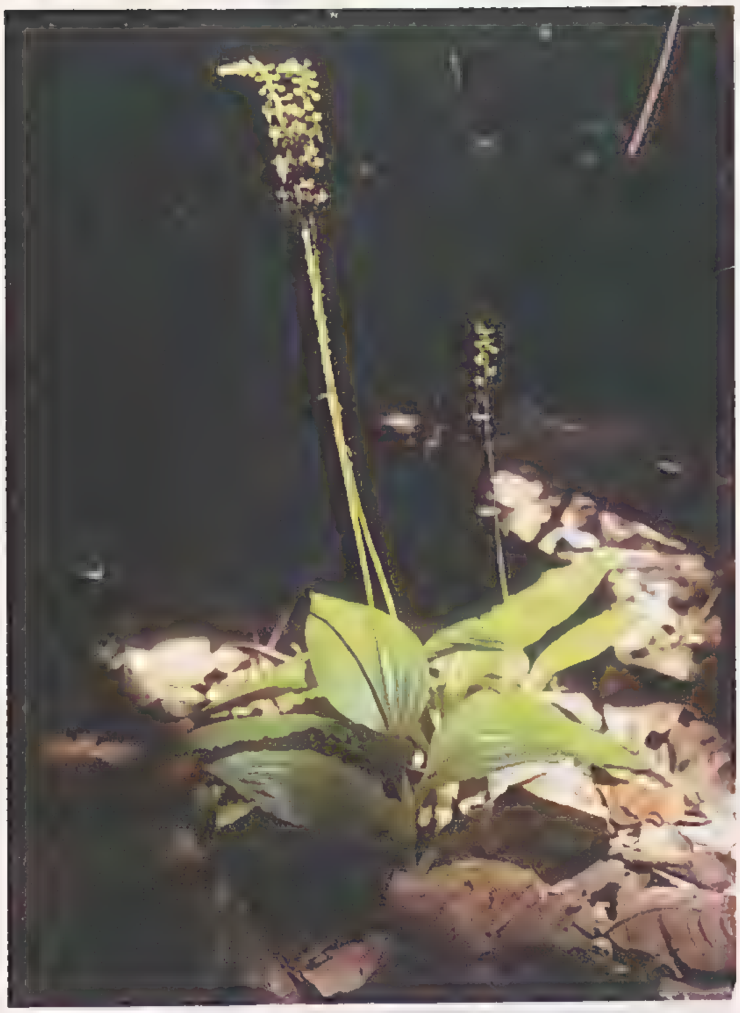


Calochilus sp. probably a new species.

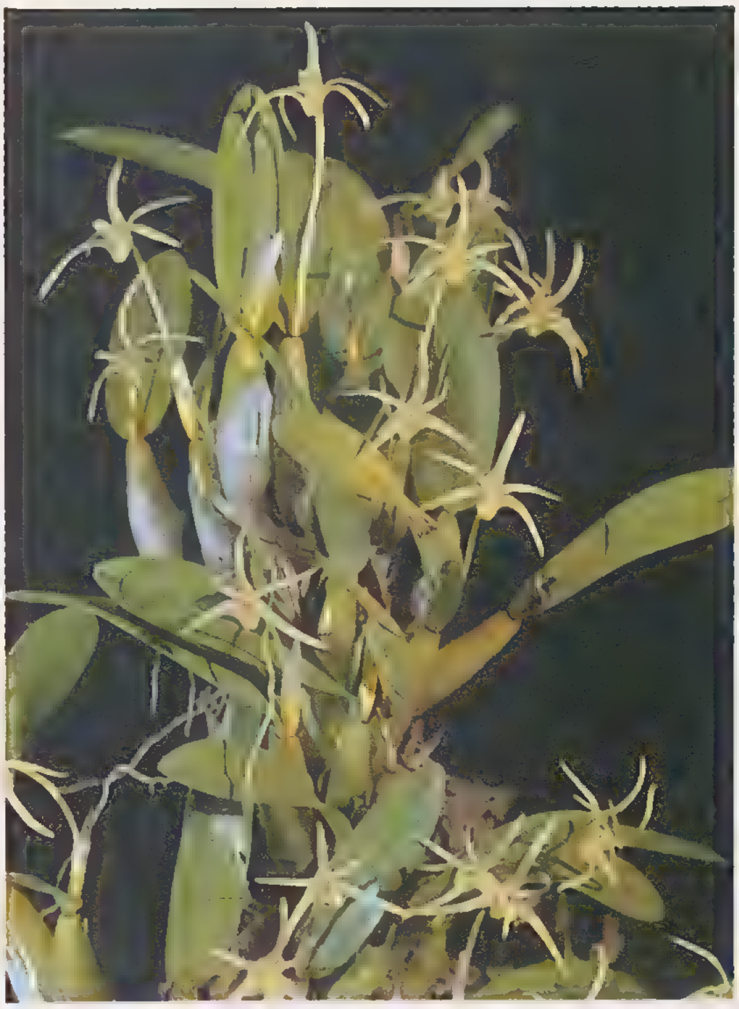
Dendrobium rigidum

Colour pictures by kind donation from H. Slade.

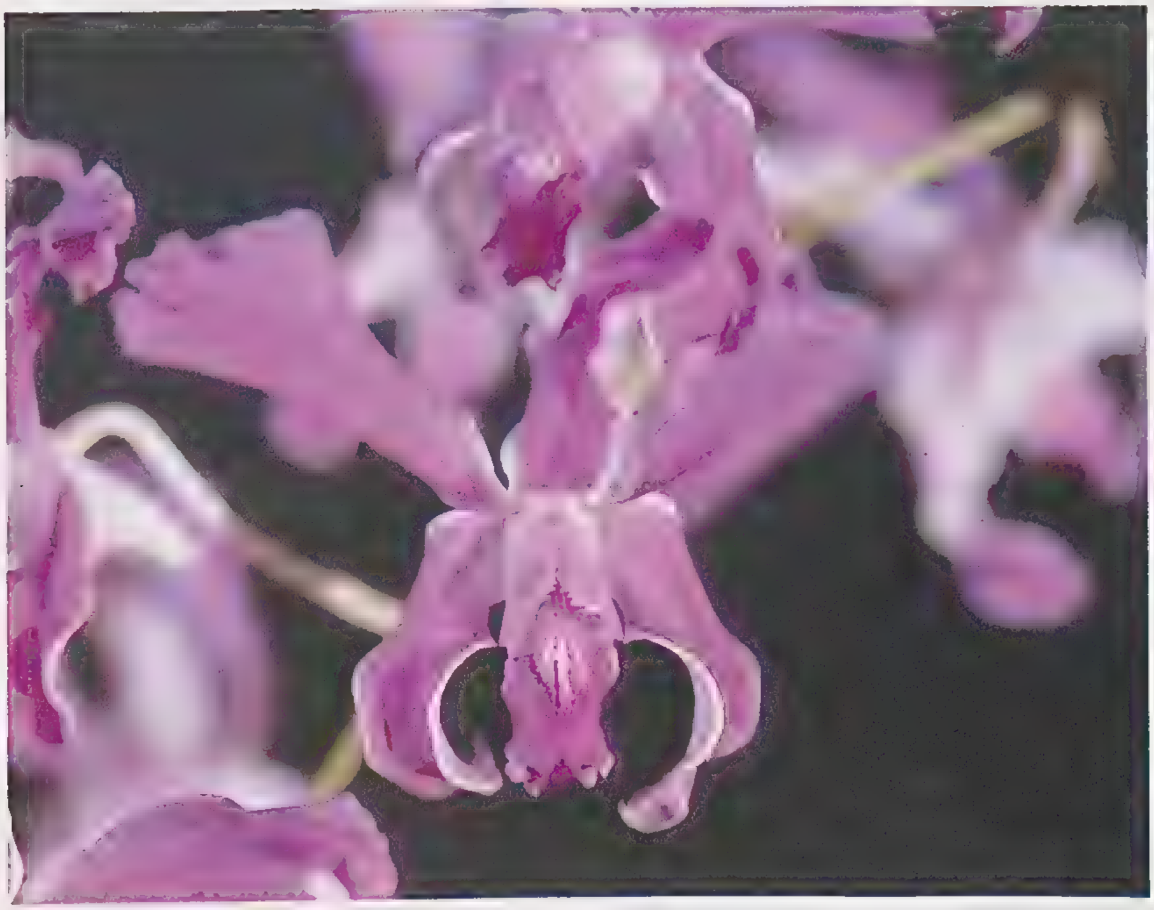
Photographs by P.S. Lavarack



Malaxis marsupichila



Diplocaulobium glabrum



Dendrobium X superbiens

Photographs by P.S. Lavarack

Cultivating *Dendrobium lineale* in Queensland

by M. J. Purnell

***Dendrobium lineale* is a free flowering species from the coastal lowlands of New Guinea and adjacent islands, and in its natural habitat is one of the more common and most attractive in the Spatulata section.**

Dendrobium lineale was known for years as *D. veratrifolium* and confused with *D. gouldii.* It grows on trees and rocks over salt water, where it can be misted by salt spray in the Huon Gulf, on mangroves in the same area, and on short trees in swampy areas round Lae, to about 500m above sea level. It is more common nearer the coast. Its range extends from the Huon Gulf to Madang, and the Sepik area and on off-shore islands.

Canes can grow three metres long; those on rocks on the seaward side of the islands are much shorter, less than a metre tall, very stout and thick, rooted strongly in rock crevices and leaf mould. On the leeward side, plants are less stout, much taller and thinner and apt to send out aerial growths, some of which also produce aerials whose roots reach down and anchor in the leaf litter at the base of trees. I noticed these leggy clones are the result of growing in reduced sunlight; semi shade produced lanky plants that reach up for light. Wind damage causes *D. lineale* to produce aerial growths readily on damaged canes. Leaves are tough, thick and leathery and extend from about one third up the canes to the top, and young leaf has a purple tinge. The length of the graceful, arching inflorescenses varies, from about thirty to a metre long, with from ten to thirty five blooms. Flower colour varies from a clear white with purple to violet veined lip on what is regarded as the "type" form, to flowers with blue, lavender, pink, green and yellowish petals, most with violet veined lips.

We collected a great many coloured varieties in the Huon Gulf islands down as far as Morobe, and I suspect *D. warianum* (syn. *D. sylvanum*) and *D. mirbelianum* which grow in the same area, could have cross pollinated with the lineales to produce these colour variations, all of which had the flower shape and growth habit of *D. lineale.* A lovely blue-lavender petalled clone occurs in the Kui area south of Lae and again just north of Madang, and these are much sought after. I have selfed my clones but so far have not flowered the seedlings, so am not sure yet, if the seedlings will have blue lavender flowers. The blooms stand out well from the stem on long pedicels and are well spaced. Petals are obliquely erect narrowed at the base, with a lazy half twist, and broader at the tip. The upper sepal curls back and slightly under, the lateral sepals curve back and under and the labellum has five raised white keels, purple on top. The side lobes of the lip are white, beautifully veined and shaded in dark purple. Some of the colour variants of *D. lineale* that we collected in the Huon Gulf area had yellow-green or yellow colour suffused in the lip, and brown purple veining. There are a great many variations in the depth of colour in the lip veinings of *D. lineale* clones, but the most desirable forms have chalk-white sepals and petals and rich violet purple veined lips.

D. lineale, is tough and adaptable; it has to be in the Mackay climate with its sometimes bitterly cold snaps and icy winter winds with sudden drops in temperatures to 3 °C, not often and not every year. *D. lineale,* like most coastal New Guinea species ceratobiums, is a tropical used to an even temperature of 22 °C to 27 °C with an average rainfall of over 6 metres of warm rain per annum, with very high humidity and constant sunlight, as most of the rain falls after 4pm and during the night. By daylight the rain is usually gone, the sun dries out the leaves and drainage is perfect as *D. lineale* grows on trees and rocks that are self-draining, so roots may be damp but not sodden all day.

Before I came back to Australia after just on twenty five years in New Guinea I had never grown an orchid in a pot. Most of my species 'ceratobiums'* were mounted on frangipani trees in the garden or on tree-fern posts. The hollow centre of these "instant" totem poles made it possible to drop a tree-fern post over a steel post driven into the lawn to provide "instant" garden decor where it was needed, and the posts could be moved if that position did not suit the plants. Plants were collected from areas that were logged for timber, brought home, trimmed and mounted on the tree-fern posts; in that climate they could not fail to thrive, given regular feeding and ample rain.

When I started to grow New Guinea species here, I was discouraged, being told they just would not grow well in the Mackay area.

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* I prefer to use the older section name rather than *Spatulata* as it is better known.
Author's Note.

I found this puzzling as *D. discolor* grows like a weed here in its natural habitat. Following a great deal of experimentation with practically every potting mix, brick and charcoal, pine bark and umpteen other mediums, I now find quincan gravel, a volcanic scoria, ideal for me in this area. Adult plants are potted in plastic pots in 20mm sized gravel, babies in sieved 10mm pieces: in thumb pots I burn more drainage holes in the bottom; 'ceratobe' seedlings will rot very smartly if the roots stay wet, so perfect drainage is a must. If possible, flasks are planted out in Spring and Summer into compots for the smallest, and thumb pots for the largest, to ensure good growth before cold weather arrives. I soak the trays in Field Pack Fertiliser solution for ten minutes after potting out; the root system establishes faster using this.

During winter, all 'ceratobiums' growth slows down and seedlings in particular barely make any growth at all; a sudden cold snap will cause all the leaves to fall off and a good many plants are lost if the snap is sudden and the temperature drops drastically. Larger plants will drop some leaves, but survive. I close all the louvres on the weather side of my shade house; with an opaque fibreglass roof plants receive sufficient light from above and sunlight through the western louvres, to survive winter. Protection from cold wind is a must; seedlings can survive gradual temperature drops over a period of some weeks, to 10 °C, but cold wind is fatal. So is cold rain, which lodges in and rots out the soft new growth, hence the fibreglass roofs. Winter watering is done about 11am and I hand water into the pots, avoiding wet leaves and fungal rot. 'Lineales' thrive in summer heat, with plenty of water over the plants to keep the leaves clean and shining. I winter feed with a low nitrogen, high phosphorous and potassium feed, with Campbells "A" alternated with Compiesal 'red' liquid feed once a week. 'Ceratobes' are never truly dormant here, and need feed and water to keep them slowly moving and to prevent dehydration. In summer I feed three times a fortnight with a high nitrogen liquid feed, Campbells "B", Aquasol, Thrive or similar liquid feed. Plants mostly have to be potted yearly as they make sturdy growth and this is where plastic pots and quincan gravel are ideal for me.

When the forward lead crowds the edge of the pot, it is upended and a sharp tap on the base after squeezing the pot between the hands, will release a compact clean pack of scoria held together by strong healthy roots. Clay pots I find are too heavy and the roots attach themselves to the inside and are damaged during repotting, plastic pots do not cause the benches to sag with their weight plus the gravel and the plant slips out with roots complete. Plants are repotted into a larger pot each year allowing some room in front of the forward lead, and filling this in with clean fresh scoria.

Adult plants are allowed to fill a 20cm pot, larger than this are too heavy to handle and the root system is massive and takes muscle to divide. Also the plants become lopsided as most 'ceratobes' march straight across the pot and over the edge; some divide en route and fill the pot better, but most produce larger and heavier canes in succession, so the plant will lean forward and over balance if left too long to divide. I leave four green healthy canes to each division and divide in spring when new leads start to grow. Each division is trimmed, potted up in fresh quincan and soaked for 10 minutes in Field Pack solution after sealing the cuts and applying fungicide powder to them. Because of the long canes, I insert a bamboo stake at the back of the pot and tie the plant firmly to it with sections of panty hose cut into strips. This has enough 'give' to keep the plant firm, but allows some movement, using a figure of eight with the tie so as not to truss them up too tightly. New roots are so soft, excessive movement will damage them, hence the restriction to avoid damage. As the new growth lengthens, it too is tied loosely to keep it growing upwards, as 'lineales' are apt to sprawl a bit and the plant if held erect, will carry the long inflorescences better, to show them to best advantage.

In summer late afternoon watering has proved the best. Here, nights are warm and the leaves dry out, and pots are drained but damp. Any water in the leaf joins at the top of the canes is drained away before the sun has any "bite' in it to 'cook' the new soft growth. Midday winter watering ensures the leaves are dry by night when the temperature drops.

Due to climatic changes here, New Guinea species 'ceratobiums' do not reach the height that they attain in their natural habitat, fortunately. Lineales flower at all times of the year but the main flush is in autumn and early winter. Here, like lasiantheras, lineales flower all year in their natural habitat. Winter cold will cause the developing flower spike to partly abort, so only ten to twelve flowers will eventually open, the remaining will refuse to develop and dry off, leaving short spikes of flowers. Lineales that flower in spring and summer will fully develop into their typical long arching sprays and the plants need their bamboo stake to support the weight of the flower spikes.

D. lineale is prone to sending out aerial growths if disturbed, or sick; the old canes will sprout at almost every eye, often after dividing and repotting. I rub off all but two of these and wait till they develop a second little cane before detaching the plantlet and potting it up.

Species are difficult to obtain these days, expensive and often traumatic to both plants and grower as fumigation on entry causes too many complete losses, so I have selfed my selected clones to create a bank of species for orchid growers to use in the future.

A good clone of *D. lineale* is most attractive, with multiple spikes of graceful white with violet lips is a very pleasing sight, and a good clone of the "blue" petalled variety is worthy of a place in any orchid collection. *D. lineale* makes superb primary hybrids and *D.* John Gunther is a most attractive free flowering clone, with features of both parents enhanced, free flowering with long spikes of blue to purple flowers with darker horns and lovely lilac lip. The cross is *D. lineale* x *D. lasianthera. D.* Huon Gulf (Wiliamsianum x lineale) has long arching sprays in lavender blue with a veined lip and *D.* Ursula (*D. discolor* x *D. lineale*) has proved a superb breeder. A sturdy grower, it passes on its ability to produce long sprays of blooms in a wide colour variation and is free flowering. All lineale primary hybrids show its strong influence with long sprays of blooms, multiple spikes and large number of flowers, and secondary and further hybrids still retain this desirable characteristic.

While the purists may lament the use of species to make hybrids and prefer to grow species only, *D. lineale* and *D. lasianthera* have proved to be excellent parents, both as pod and pollen parents, and have given to the orchid world some truly lovely hybrids in the last twenty years. They are more adaptable to climatic changes than the species, with a wide range of lovely colours, are hardy and free flowering, but I shall always keep the species parents.

So many growers have never seen the original species, and I feel, if possible, growers should be familiar with the plants that made their lovely hybrids possible.

M. J. Purnell
6 Holmes Drive, Beaconsfield
28 December, 1986 North Mackay, Qld. 4750

Recent Recordings in the Coffs Harbour - Dorrigo - Grafton Triangle

by M. Corrigan

On a recent visit to the Coffs Harbour area some very interesting native orchids were observed. The precise area of the 'triangle' is, Coffs Harbour south west to Dorrigo, then north east to Grafton and south to Coffs Harbour.

On one very long and arduous climb in dense scrub (5th January 87) we saw a dazzling display of native orchids in an area smaller than a tennis court. Species seen included: *Sarcochilus fitzgeraldii* growing on boulders and rocks everywhere, even small stones protruding from the ground cover often bore two small plants. *Sarcochilus olivaceus* growing on both rocks and trees, *Sarcochilus falcatus* growing on trees at a height of no more than 2m from the ground. *Pteroceras spathulata* growing on immature hoop pine and in flower. *Liparis reflexa* carpeting the boulders in great masses. *Plectorrhiza tridentata* hanging from both trees and scrub. *Dendrobium tetragonum, D. beckleri, D. kingianum, D. gracilicaule, D. speciosum* var. *hilli, Rhinerrhiza divitiflora, Bulbophyllum exiguum* and *B. crassulifolium* were to be seen in profusion.

On a hair-raising ride by Toyota van to a very steep creek bed, we experienced the sight of a lifetime. Amongst the gloom of rainforest beside the creek bed we were led to a jumbled log jam and there in a very small clearing with slightly more light than the immediate surrounding area was *Pseudovanilla foliata* in full bloom (8th January 87). Main stem some 3m long, meandering over the fallen logs in an untidy scramble. The original finder had previously pollinated several flowers some days before and some appeared to have 'taken', whilst other fresh unpollinated flowers had already dropped whilst still open. No doubt the very hot and humid conditions had contributed to this.

The log jam was surrounded by *Calanthe triplicata* in full flower. The lovely white flowers stood out in the heavy rainforest gloom like ghostly sentinels, whilst a lone plant of *Sarcochilus olivaceus* kept a lonely vigil, low down on the moss covered buttress of a eucalypt giant. *Cymbidium madidum* plants festooned a tree close by. Thankfully these gems will be safe from collectors as they reside in a near inaccessable valley on private property jealously guarded by the 'family'.

Dendrobium monophyllum was found in large quantities, growing on sandstone boulders in an area south of Grafton. A new southern recording for the species? On the same boulders we found *Bulbophyllum minutissimum* growing in profusion. One deep crack in a gigantic boulder was some 200mm wide and both faces were entirely covered with this diminutive species. Each face would measure 1.5m x 1.0m. The plants grew to perfection and obviously enjoyed the southern aspect. Many plants had seed capsule nearing maturity. Previously I had seen this tiny *Bulbophyllum* growing only on *Ficus* sp. in N.S.W., whilst in Queensland I have seen the species growing on sandstone boulders, *Ficus* sp. and bottle trees. To see this gem in profusion made the long, hot, tramp worthwhile.

Other species growing on the sandstone were *Dendrobium speciosum* var. *hillii, D. linguiforme, D. kingianum, Liparis reflexa* and *Bulbophyllum crassulifolium. Cymbidium madidum* and *C. suave* were observed in the trees nearby.

Nearby, in lonely splendour, *Sarcochilus ceciliae* may be found growing on rocks. Whilst this was considered as a possible new southern recording for the species, Michael Harrison assures me that the species is found further south in the Hastings Valley.

One of the party has found *Bulbophyllum minutissimum* growing on limbs from a tree fall but has yet to find the host tree. As this is a new area for the species we hope he searches diligently. The following list includes all species recently seen and positively identified by three workers over a period of two years up to 29th January, 1987.

- *Dendrobium teretifolium* var. *teretifolium*
  - *teretifolium* var. *fairfaxii*
  - *tenuissimum*
  - *beckleri*
  - *kingianum*
  - *speciosum* var. *hillii*
  - *gracilicaule*
  - *tetragonum*
  - *tetragonum* var. *hayesianum*
  - *aemulum*
  - *falcorostrum*
  - *monophyllum*
  - *linguiforme*
  - *pugioniforme*
  - *cucumerinum*
- *Dendrobium X gracillimum*
  - *X delicatum*
  - *X suffusum*
  - *tenuissimum x pugioniforme*
- *Liparis reflexa* var. *parviflora*
  - *coelogynoides*
  - *habenarina*
- *Cymbidium madidum*
  - *suave*
  - *canaliculatum*
- *Oberonia palmicola*
- *Bulbophyllum elisae*
  - *exiguum*
  - *crassulifolium*
  - *aurantiacum*
  - *weinthalii*
  - *tuberculatum* (now found by 4 workers in different localities in the area)
  - *minutissimum*
- *Sarcochilus falcatus*
  - *olivaceous*
  - *hillii*
  - *ceciliae*
  - *fitzgeraldii*
  - *hartmannii*
  - *australis*
- *Papillilabium beckleri*
- *Plectorrhiza tridentata*
- *Rhinerrhiza divitiflora*
- *Pteroceras spathulata*
- *Taeniophyllum wilkianum*
- *Peristeranthis hillii*
- *Schistotylus purpuratus*

12 March, 1987

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S. fitzgeraldii X *S. fitzgeraldii* v. *aemulus*
S. hartmannii X *S. fitzgeraldii*
S. Mavis X *S. fitzgeraldii* v. *aemulus*
S. Mavis X *S. ceciliae*
S. Melba X *S. fitzgeraldii*
S. Melba X *S. hartmannii*
S. Shooting Star X *S. fitzgeraldii*
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A.N.O.S. Update

We have been honoured by Mr G. Hermon Slade with his acceptance of the position of Patron of our Society. Hermon is extremely well known throughout the whole orchid world and will keep the Australasian Native Orchid Society's objectives to the fore wherever he goes.

The current Council is taking action to improve the Australasian Native Orchid Society and to achieve this an Organisation subcommittee has been set up to place A.N.O.S. on a business footing. Very briefly the organisation will comprise seven sub-committees responsible to the council and to whom they will make monthly reports.

The sub-committees are:—

1. Publications. Responsible for all society publications.
2. Group Liaison. Responsible for keeping the groups informed on all matters on a regular basis.
3. Marketing. Responsible for all marketing matters, be they the sale of our publications and their distribution, the obtaining of new members, publicity in general or the sale of various products as they become available.
4. Conservation. To produce and implement our conservation policy.
5. Judging Panel. Responsible for all judging and related matters. This includes the training of new judges, and the preparing of judging instruction by video or similar for members too far away to attend judging classes in Sydney.
6. Finance. Responsible for all finance matters, including budgeting.
7. Organisation. To be responsible for the reorganising of the Society so that it will be a more viable society. To prepare a new constitution for submission to the members at the next A.G.M.

Much work has been done by the Organisation sub-committee and things are starting to take shape, but of course more time and effort has to be concluded before any satisfactory degree of finality of purpose can be achieved.

The Orchadian is to be greatly improved and to this end we have approached many prominent members asking for their assistance in becoming Editorial Associates for their own particular area. This will ensure that we receive regular articles from all over Australasia and our members will be kept informed on all matters relating to Australasian native orchids. It is intended that there will be a balance of the kind of articles that will be produced. All members will be catered for: articles on culture, on walks in the bush, of a social nature, together with the more serious, scientific and taxonomic articles, there will be articles for us all to enjoy.

So far we have received four replies from experienced and knowledgeable persons accepting the positions of Editorial Associates, they have the expertise to greatly uplift The Orchadian. They are:—

Dr Peter (Bill) Lavarack Ph.D. Bill lives in the Townsville area; he was educated at the Queensland University where he graduated in 1965 with 1st class honours in Botany. He is at present Senior Botanist with the Queensland National Parks and Wildlife Service at Townsville. Bill Lavarack has published many papers on orchids and other plants and is the co-author of the recently published book "Tropical Orchids of Australia".

Dr Brian Molloy Dip.Agr., Dip. Tchng., M.Sc. (Hons) Ph.D. Brian was born in Wellington, New Zealand. He is a scientist at the Botany Division of D.S.I.R. at Lincoln, New Zealand where his work includes studies of several plant groups, nature conservation and soil and vegetal history. He is the co-author of the recently published book "Native Orchids of New Zealand".

Leonard J. Lawler. Len gained his fellowship of the Australian Institute of Medical Scientists with a thesis on biochemical investigation of Australian Orchidaceae. Prior to his recent retirement he was a professional officer at the University of Sydney in the Department of Biochemistry. His work entitled "Ethnobotany of the Orchidaceae" which appears in "Orchid Biology, Reviews and Perspectives III", edited by Joseph Arditti, is a must for any serious student of orchidology. Len is now enjoying his retirement on the lovely Atherton Tablelands where he is considering forming a group of native orchid enthusiasts.

Neville H. S. Howcroft. Neville was born and educated in Queensland. He has been actively involved in forest research work for over thirty years of which the majority has been spent in the Papua New Guinea forest service. He is at present officer in charge of the Research Section of the Bulolo Research Station and is a lecturer at the Bulolo Forestry College. He has had many articles published on New Guinea orchids.

The main aim in our reorganisation is to ensure that our members are well satisfied and that the Australasian Native Orchid will be helped to be given its rightful place in the world. We would welcome any comments and views as these would greatly assist us in our endeavours.

Walter T. Upton,
Chairman.
Organisation Sub-Committee.

From the Back of the Bushhouse

by Dr P. S. Lavarack

I was foolish enough to suggest to Wally Upton that "The Orchadian" needed a column of orchid news and views. Wally responded that it was a good idea and, of course, offered me the first go. I hope this will be the first of a regular series of columns done by prominent orchid people from all around Australia and beyond. Stuck up here in the "Deep north" I am not in intimate contact with the latest gossip down south so I'll be attempting to give you, the subscribers to "The Orchadian", an insight into the scene in the allegedly wet tropics.

Hunting Nervilias

Can any form of orchid endeavour be more frustrating? The genus *Nervilia* contains some truly lovely flowers. They all seem to have a similar habit of growth at least in Australia — producing a flower spike of 1-5 or 6 flowers a couple of weeks after the first soaking rain in November or December. The flowers do not last long — a few days accounts for each inflorescence, but to compensate they tend to grow in large quantities and flower over a period of a couple of weeks. However if you want to see them in flower you have to guess whether the rain has been sufficient to trigger them off or not, then time the field trip with the finesse of a Greg Norman approach shot. Even then it seems to be the equivalent of a hole in one to find them in flower. I have been watching a population of an interesting, probably new, *Nervilia* on Hinchinbrook Island but the early wet has been so poor this year that they have not flowered. Dave Jones and Bruce Gray are having similar problems at Bamaga which is even harder to get to than Hinchinbrook. I have both species growing beautifully but have so far produced only one flower on the Bamaga plants and none on the others.

The Wet

This year in the north the wet season has been something of a non-event. Townsville has had only a few scattered storms and no serious wet season. Things are little better further north where the Tully River is scarcely able to float the rafts of the adventure rafting companies. Northerners complain bitterly about cyclones, but in years like the present, with no tropical disturbances on the east coast so far, rainfall is very low. Consequently few terrestrial genera such as *Habenaria, Nervilia, Calochilus, Malaxis* and others have bothered to flower.

McIlwraith Range Revisited

Last year I spent August-October in the McIlwraith Range with Operation Raleigh. The aim of this expedition was to provide adventure training for a group of predominantly English young people. The secondary aim was to produce a vegetation map of the area. Unfortunately I was handicapped by a bad knee and did not get into many new areas, but I was saddened to see extensive clearing on the Rocky River in the lowland gallery forests all in the cause of "prospecting". In one area a road had been detoured deliberately around a tree which could easily have been knocked down by the bulldozer. On closer inspection the tree was seen to have several large plants of *Vanda whiteana* in it — so the miners do have a heart. Active prospecting was also occurring at Leo Creek — although this was less destructive. Some interesting finds in the Leo Creek area included a large population of *Podochilus australiensis* and also several good plants of *Phalaenopsis amabilis.*

Cape York

Some of you will already have seen my report on the "Orchids of the Cape York and Jardine River areas"*. The field work for this report was done in February 1986 and we stayed at Air Queensland's Top of Australia Wilderness Lodge. At that time it was still under construction. Now it is completed it has had the effect of opening this remote area up to a new class of tourists. No longer is a four wheel drive required. Now you can travel by air and live in luxury right amongst some of the most interesting orchid country in the north. It is not cheap, but if you can afford it and if you can be satisfied with looking and not collecting, then I recommend this as a place to stay. Further I suggest the wet season (January to March) as the time to visit. Certainly the weather is hot and humid, but in February when I was there it is not unbearable and the plant and bird life is fascinating. Fees are, I believe, lower in the wet season too. Lots of interesting areas are reachable on foot by the adventurous. The fishing is excellent too, so I am told.

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* A shorter version of this report appears in this issue.

The *Dendrobium* Complex or Which Way Will They Go?

by A. W. Dockrill

Dendrobium in the broad sense (Subtribe _Dendrobiinae_ of the tribe _Dendrobieae_) has long been recognised as an unwieldly taxon. From time to time different authors have reinstated or elevated sections to the status of separate genera.

Those that concern us in Australia are *Cadetia, Diplocaulobium* and *Flickingeria.* There were, for the most part, separated on the grounds of plant form and flowering habit rather than flower structure which seems odd when one considers the diversity of flower structures within the subtribe. However, Brieger in Schlechter, Die Orchideen ed.3, Vol. 1 (1981), although for the most part validly published, carried the break-up to unrealistic extremes, elevating each of most of the sections of *Dendrobium* to the status of a separate genus and including some sections of *Eria,* which he also elevated to the status of genera, in the same alliances as some of the *Dendrobium* sections (newly elevated to genera), so that the subtribe embraced a total of 44 genera. This elicited a strong reaction in most quarters and a group of international specialists, Holttum, Stewart, Seidenfaden and Schelpe in Taxon 34(1):122-135 (Feb. 1985), recommend that systematists follow the lead of Kew in maintaining the *status quo* classification until the whole matter can be thoroughly investigated. This again, seems a little odd as one cannot help thinking that the opportunity to investigate the complex has existed for many years for those workers who have a vast array of specimens and literature at their disposal.

There are, broadly speaking, 3 readily recognisable plant forms within *Dendrobium,* in Australia at least.

1. Plants consisting of a group, usually tuft but sometimes spaced apart on rhizomes, of leaf-bearing axes (stems) which are fleshy (pseudobulbous) at least for the greater part of their length, are usually, although not always, elongate and bear from one to many leaves and lateral or pseudoapical inflorescences. Within this group are: (a) Sections *Dendrocoryne, Eleutheroglossom* and *Trachyrhizum,* for example in which the flowers have a labellum which is attached to the apex only of the column foot and held well clear of the column and its foot; (b) Section *Latouria,* in which the labellum is joined to the apex only of the column foot but the high keels of the labellum are incumbent on or held in close proximity to the column and/or its foot to form a kind of pseudospur; (c) Sections *Dendrobium, Spatulata* and *Phalaenanthe,* in which the sides of the claw of the labellum are joined to the sides of the column foot to form a spur; (d) Section *Pedilonum,* in which the sides of the proximal part of the labellum are usually, for a short distance, joined to sides of the distal part of the column foot but the proximal part of the labellum is saccate and separated from the distal part by a transverse septum and the column foot is, for the most part, tubular and itself a nectary.

2. Plants in which the leaf-bearing axes (stems) are usually in tufts and elongated but not at all fleshy, being woody or wire-like, and bear from rather many to numerous distichous leaves and lateral one or few flowered inflorescences of, usually, short lived flowers. Within this group are: (a) Sections *Grastidium* and *Monanthos,* in which the labellum is attached to the apex only of the column foot; (b) Section *Conostalix,* in which the sides of the claw of the labellum are joined to the sides of the column foot to form a spur; (c) Section *Dichopus,* in which the labellum is attached to the apex only of the column foot but there is the unique feature of the column, below the stigma, being furnished with a large, movable, double-headed strap-like appendage.

3. Section *Rhizobium,* in which there are sympodial branching rhizomes, each branch terminating in a rhizome-like rudimentary or short "leaf-bearing axis", of one internode, which bears at its apex a large fleshy leaf and one or a few inflorescences which may be one or few flowered or racemose. The sympodia may be incumbent on the substratum and rooting throughout or rooting mainly from near the base only with the remainder erect, drooping or pendulous. Throughout this section the labellum is attached to the apex only of the column foot.

It can be seen from the above that there is a wide diversity of plant forms and flower structures embodied in the genus as currently recognised. Interestingly, putative natural hybrids have been recorded or reported between species of section *Dendrocoryne*, species of Section *Spatulata* and species of Section *Rhizobium* also between a species of Section *Spatulata* and one of Section *Phalaenanthe* but none between species of the above group "2" or between a species of one of the three numbered groups with a species of one of the other numbered groups. This would seem to suggest that there is little compatability between the three groups and no doubt many hybridists are aware of this although some strange garden hybrids have been raised. It will be interesting, indeed, to see how specialist taxonomists will treat this highly complex and important subtribe of orchids.

P.O. Box 127,
Atherton,
Qld. 4883.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the R.H.S. from lists in the Orchid Review December 1985 — December 1986)

NAME	PARENTAGE	REGISTERED BY
DENDROBIUM		
Aussie Hero	Eureka X Kingrose	P. Spence
Aussie Joy	Peter X *falcorostrum*	P. Spence
Aussie Quest	Graham Hewitt X Gillian Leaney	P. Spence
Memoria Eric Gordon	X *delicatum* X Peter	P. Spence
Miara	Hilda Poxon X *falcorostrum*	N. Roper
Rutherford Star	Star Imp X *tetragonum*	T. J. Smith
Black Mickey Mouse	Rachelle Simpson X *canaliculatum*	Suphachadiwong's
Tambar	Golden Fleck X Aussie Glow	R. Arnott
Aussie Child	Hilda Poxon X Aussie Spectrum	P. Spence
Aussie Utmost	Aussie Starlight X Kingrose	P. Spence
Aussie Zest	Eureka X Aussie Starlight	P. Spence
Blushing Sun	Sunglow X Blushing Star	D. Cannon
Delicate Ellen	Ellen X Specio-kingianum	D. Cannon
Jenni	Yondi X Kingrose	S. Batchelor
Lloyd Stainton	X *superbiens* X *canaliculatum*	Lonne's (I. Lonne)
Nathan Wall	*kingianum* X Double Two	V. & N. Jupp
Sun Star	Sunglow X *tetragonum*	D. Cannon
Sweet Ellen	Ellen X Susan	D. Cannon
Arcadia	Eureka X Hastings	D. Banks
Berserker	Hilda Poxon X Peter	D. Banks
Ferg Martin	Ellen X Penny Ann	D. Banks
Margery Angeleri	Aussie Bonanza X Golden Fleck	D. Banks
Northmead	*speciosum* X Ku-Ring-Gai	D. Banks
Rutherford Supreme	Wonga X Hastings	T.J. Smith
Bright Spark	John Upton X *tetragonum*	W. T. Upton
Coljohn	Colin X John Upton	W. T. Upton
Minuet	Penny Ann X Goblin	W. T. Upton
Big Fleck	*bigibbum* X *fleckeri* W. T. Upton	
Elegant Heart	Peewee X *speciosum*	W. T. Upton
Debra Wray	Specio-kingianum X Kingrose	S. Wray
SARCOCHILUS		
Camira	Southern Cross X Fitzhart	C. Brandon
Lowana	Lois X *falcatus*	C. Brandon
Susan	*falcatus* X *weinthalii*	Florafest's
Arcadia	Lois X Fitzhart	D. Banks
George Colthup	Melba X *hartmannii*	D. Banks

A Question of Parentage

by M. McTiernan

In late 1981 A.N.O.S. published the second edition of 'A Checklist of Australian Native Orchid Hybrids' which I duly purchased thinking that it would bring me up to date with hybrid registrations. Well, the Checklist did provide this information but the flood of new registrations reported in following issues of The Orchadian soon rendered it obsolete.

I felt the answer lay in keeping my own register of hybrids, maintained in such a way that new entries could be easily inserted. In this way, the listing would always be current and I would not be dependent upon the publishing by others of updates. Any published checklist will become obsolete very soon after issue.

My system was simple. I purchased a quantity of cards about 5″ x 3″ in size, and a box for storage. I then took the Checklist and began recording every hybrid it listed. Each hybrid was given a card with its name entered on the top right hand side and the parent's names (whether hybrids or species) entered on the top left hand side. Then, in turn, an entry was made as a cross reference on the card of each parent. Where a parent was itself a hybrid, an entry was made on that hybrid's card showing the other parent and the name of the new cross. Where a parent was a species (and assuming that it was the first record of that species being used as a parent) then a new card was created with the name of the species in the top right hand corner. A further entry was made on that card showing the other parent and the name of the new cross. Subsequent hybrid registrations using the same parent were recorded on the same card. All cards were then filed alphabetically based on the name in the top right hand corner. Registrations subsequent to the Checklist have been entered from information published in The Orchadian.

The result is an up-to-date and completely cross referenced index. A review of the *Dendrobium* index yields some interesting observations. The species most often used as a parent in hybridising is *Dendrobium kingianum* with thirty listed hybrids of which it is a parent. This is closely followed by *D. speciosum, D. tetragonum* and *D. falcorostrum* in that order.

Perhaps more interesting is that there are many cases where hybrids with the same composition of species in their parentage have been registered with different names. One such example is that of *D.* Aussie Mist and *D.* Aussie Spice. *D.* Aussie Mist is *D.* Peter x *D.* Bardo Rose which comprises 50% *D. falcorostrum*, 25% *D. kingianum* and 25% *D. fleckeri*. *D.* Aussie Spice is *D. falcorostrum* x *D.* Hastings which comprises the same percentage of the same species as the foregoing. There are many other similar instances e.g. *D.* Delicate Falcon and *D.* Ultravox or *D.* Harold Hirsch and *D.* Sun Sprite. As both *D.* Aussie Mist and *D.* Aussie Spice were registered by the same hybridist, Mr P. Spence, it would be interesting to hear if the two hybrids are similar, particularly if the same clones had been used as parents (which is probably unlikely). Had the same clones been used then I would expect that this would probably be the case.

Here is a question. What would be the result of crossing *D.* Gillian Leaney with *D.* Jane Leaney? Well mathematically you would have a hybrid which comprises 50% *D. speciosum* and 50% *D. kingianum*. That might sound like *D.* X *delicatum* to some people. However the hybridist would be entitled to give it a new name! This potential exists with any hybrid thus effectively renaming an existing registration. Let us hope that this is not abused and that hybridists carefully consider their aims before making a particular cross.

Now I can imagine many of you rushing to your records to see whether or not, perhaps *D.* Andrew Upton has the same parentage as, say, *D.* Essie Banks. Well as most leading hybridists will quickly tell you, definitely not! Nevertheless these somewhat amusing possibilities lead me to some observations about the naming of our hybrids.

Frankly, I prefer those names that convey some information about the hybrid's appearance or parentage. Good examples would include names such as *D.* Star of Gold and *D.* Delicate Falcon (*D.* X *delicatum* x *D. falcorostrum*). Equally appealing names to my mind include those that commemorate an orchid personality such as *D.* Ira Butler or those that form part of a series and so give information about both the hybridist and the orchid such as *D.* Aussie Ochre. I believe that the naming of a hybrid is a serious matter which should be approached with an eye to the future. Will others see the name as appropriate or will they instead say things such as 'a great flower but what a pity about the name'.

We already have some hybrids with names apparently commemorating obscure groups of persons who have no known connection whatsoever with horticulture. Yet other registrations are so puzzling as to defy explanation of the reasons leading to their naming. So before you send in that registration think about the legacy you are leaving for fellow enthusiasts.

31 August, 1986

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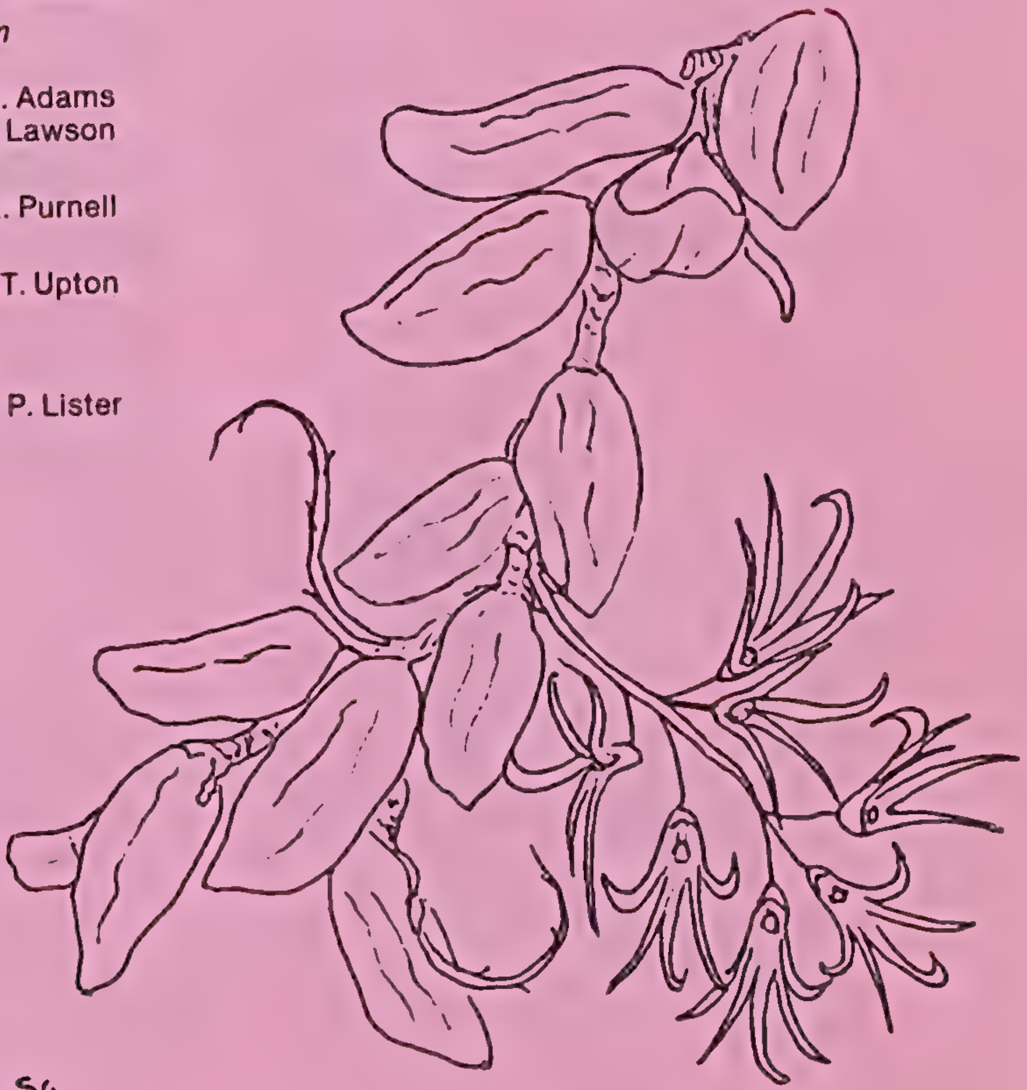

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Dipodium punctatum (Smith) R.Br. — Alba form in East Gippsland, Victoria

Follow-up of initial report

by Dr Peter B. Adams

Following the report of alba flowering *D. punctatum* in Victoria (Adams, 1986) and request for similar observations, I received only one recording of other alba plants. Everett Foster of Belmont described alba *D. punctatum* in flower along the roadside between Buchan and Murrindal in eastern Victoria on 10th October 1985. A later visit to this site on 5th January 1987 revealed pink spotted flowering plants but no albas. A few plants were still in bud and too immature to determine flower colour.

Mrs Lee Coke notes that the two alba flowering plants initially reported in East Gippsland in January 1986 did not reappear in the summer — autumn period of 1987. The number of pink flowering *D. punctatum* in the area was also much reduced compared with the previous year.

The occurrence of alba plants of *D. punctatum* is apparently rare, and their flowering is spasmodic over time. The sites of identified alba plants will be re-examined in future flowering seasons.

References

Adams, P.B. (1986) *Dipodium punctatum* (Smith) R. Br. — Alba form in East Gippsland. The Orchadian **8**: 169-172.

Botany School
University of Melbourne
Grattan St.,
Parkville 3052 Vic.

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Caladenia stricta: New Status for an Australian Terrestrial Orchid

by R. Bates

Caladenia stricta **(R. Bates) R. Bates, based on** ***Caladenia dilatata*** **R.Br. var.** ***stricta*** **R. Bates J. Nat. Orchid Soc. S. Aust. 3 (3): 23 (1984) is briefly described and illustrated with colour photographs and line drawings. The reasons for its elevation to species status are discussed.**

Introduction: The name *Caladenia dilatata* R.Br. is presently being applied to what is essentially a complex alliance of species occurring across southern Australia (Bates 1979, 1984). These species are pollinated by sexually attracted male thynnid wasps (Stoutamire 1983) and, due perhaps to their common pollination strategy, have a remarkably similar colour pattern, namely a yellow-green perianth with red markings, all species possessing a deep red labellum apex. Morphologically, however, the species show a wide diversity in flower size (and proportion of parts), position of perianth segments, labellum shape and fringing, and size, colour and presence of osmophores on petal and sepal tips. Some of the more outstanding taxa have already been separated out i.e. *Caladenia toxochila* Tate (synonym *C. dilatata* var. *concinna Rupp), C. gladiolata* R. Rogers and *C. dilatata* var. *falcata* Nicholls. In 1984 the present author named and described *C. dilatata* var. *stricta* which is now treated as a species *Caladenia stricta,* for the reasons given below.

I. Field research has shown that *C. stricta* is pollinated by a different wasp species to other species of the *C. dilatata* alliance with which it grows. The pollinator of *C. stricta* is a very large species of black thynnid wasp; other species of the *C. dilatata* alliance growing with *C. stricta* were pollinated by much smaller thynnids. *Caladenia dilatata* sensu stricta in Tasmania is pollinated by a small black thynnid with white markings. Stoutamire (1975) was the first to point out that different "forms" of *Caladenia dilatata* sensu lato were pollinated by different wasp species, therefore isolating them reproductively into "bio-species".

Morphological differences are, and always will be the basic criteria for recognising species, but reproductive isolation is equally important (Wiley 1984, Carr 1986). *Caladenia stricta* qualifies as a distinct species on both counts.

II. Previously *C. stricta* was thought to intergrade with at least one other species of the *C. dilatata* alliance but observation of over one hundred locations where *C. stricta* was sympatric with these other species showed intermediates at only five disturbed sites and those intermediates are here interpreted as spontaneous hybrids. *C. stricta* also hybridises with *C. patersonii* R.Br. The hybrids are probably due to occasional transfer of pollinia by insects other than thynnid wasps.

III. *Caladenia stricta* is the only species of the *C. dilatata* alliance to consistently lack glandular tips to the sepals (these glandular tips are referred to as osmophores) and for this reason is one of the most distinctive members of the group. It has been considered that *C. stricta* is a mimic of other species and does not produce a wasp-attracting odour, but this is unlikely, considering it does not utilise the same pollinators as sympatric species and often outnumbers them.

IV. *Caladenia stricta* is a widespread and constant species with a range of about 800km around the coast of southern South Australia and into Victoria. It cannot for that reason be considered a local variant.

V. Further taxonomic work on the *C. dilatata* alliance will be simplified by the 'removal' of *C. stricta* as a distinct species.

Caladenia gladiolata R. Rogers is sometimes treated as being close to the Western Australian *C. longiclavata* as both have flattened osmophores but as noted by Woolcock & Woolcock (1984) its closest ally is *C. toxochila.* Indeed some collections of *C. gladiolata* with short osmophores have been identified incorrectly as *C. toxochila.*

Short Description of *Caladenia stricta.*

Slender to robust, 10-30cm high; leaf only slightly hairy, lanceolate 3-6cm x 1.5cm, rigid with maroon or red blotches especially below; flower single, rarely two; yellow-green and maroon; thick-textured and rigid; perianth segments all similar 1.5-2.5cm long with acuminate non glandular, non clavate tips, with a red median stripe; dorsal sepal erect, lateral sepals and petals spreading, petals slightly narrower; labellum yellow with green margins and decurved maroon apex, the side lobes obscure, margins deeply but stiffly combed, labellum calli in obscure rows, usually crowded, mainly pyriform, with shorter flat-topped ones near the apex, red with a pale yellow base or less often wholly red; column broad, recumbent, widely winged above, with a pair of large sessile oval basal calli.

Occurs in more fertile soils of the wheat belt (300-600mm rainfall per year) often associated with limestone but also on granite outcrops in mallee-heathland or open *Allocasuarina* woodland. More common near the coast but rarely littoral.

Flowering: September-October, individual flowers lasting up to ten weeks.

V. Further taxonomic work on the *C. dilatata* alliance will be simplified by the 'removal' of *C. stricta* as a distinct species.

Key separating *Caladenia stricta* from similar species:

1. Labellum margins almost entire or with very short teeth 2

1. Labellum margins deeply fringed, combed or toothed 3

  2. Labellum longer than broad; sepals and petals ending in flattened bayonet-like, glandular — aromatic osmophores .... *C. gladiolata*
  (Webber & Bates fig. 950A).

  2. Labellum broader than long; osmophores absent or reduced to short non-aromatic clubs .... *C. toxochila.*
  (Woolcock, plate 23c)

    3. Sepals and/or petals with osmophores, labellum calli golf — club shaped .... *C. dilatata*
    (Nicholls, plate 265)

    3. No osmophores, labellum calli pyriform .... *C. stricta*
    (Pocock, photo 41, as *C. toxochila*)

References

Bates, R. (1979) 'Variation in the Species *Caladenia dilatata* R.Br. ...' *J. Nat. Orch. Soc. S.Aust.* 3(9):7-9.

Bates, R. (1984) 'A New Variety of *Caladenia dilatata* R.Br. from South Australia' *J. Nat. Orch. Soc. S.Aust.* 8(3):23-27.

Carr, G. W. (1986) *Caladenia calcicola* (Orchidaceae), a New Species from Victoria. Muelleria 6(3):185-191.

Hoffman, N. & Brown, A. (1984) Orchids of south-west Australia.

Nicholls, W.H. (1969) Orchids of Australia, the complete edition.

Pocock, M.R. (1972) Ground Orchids of Australia.

Stoutamire W.P. (1975) 'Pseudo-copulation in Australian Terrestrial Orchids' *Amer. Orch. Soc. Bull.* 44:226-233.

Stoutamire W.P. (1983) 'Wasp Pollinated Species of *Caladenia* in south-western Australia' *Aust. J. Bot.* 31:383-394.

Weber J.Z. & Bates, R. (1986) in Jessop & Toelken, editors, *F1. S.Aust.* 4th edn. 4:2065.

Wiley, E. (1981) Phylogenetics. The Theory and Practice of Phylogenetic Systematics.

Woolcock, C. & D. (1984) Australian Terrestrial Orchids.

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38 Portmarnock St.
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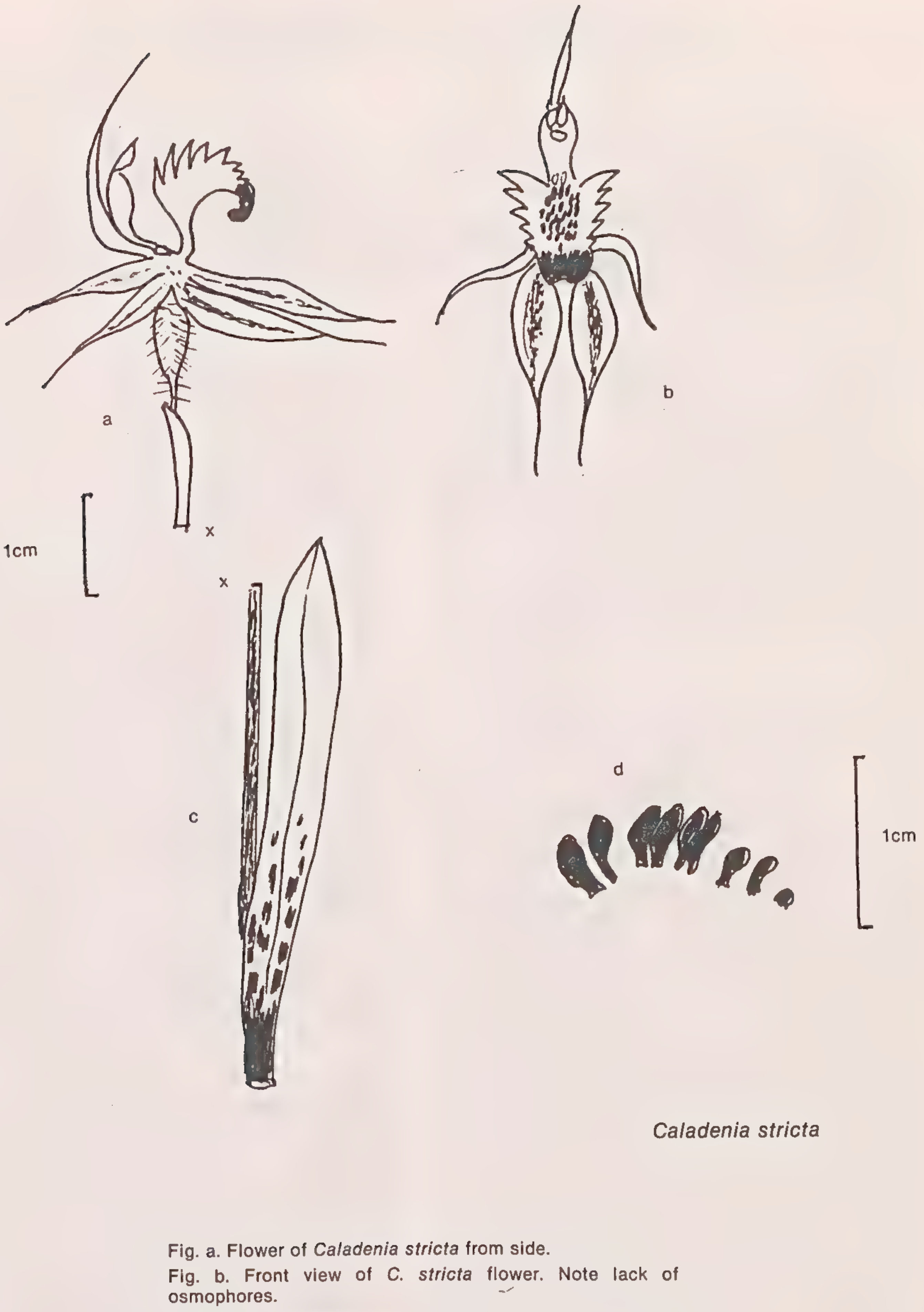
Editor's note: Osmophore is a scent-producing gland.



Caladenia stricta

Fig. a. Flower of *Caladenia stricta* from side.

Fig. b. Front view of *C. stricta* flower. Note lack of osmophores.

Fig. c. Leaf showing red basal markings and lower part of scape.

Fig. d. Calli of labellum showing change in size from tallest near base to short near apex.

Pollination of *Dendrobium kingianum* Bidw. by the Honey Bee (*Apis mellifera*)

by *Dr P.B. Adams
¶ Dr S.D. Lawson

Summary

A full pollination sequence was observed in a private collection of *Dendrobium kingianum* originating from the Buckets near Gloucester, N.S.W. The pollinator was identified as a small variant of the common honey bee *Apis mellifera.* It is widespread over the *D. kingianum* distribution and likely to be a significant pollinator of larger flowering clones. A mass display of colour and intense fragrance production are the major attractants for pollinators.

Dendrobium kingianum is a variable spring flowering lithophyte setting seed capsules in the summer months. In natural populations we have estimated low conversion rates of flowers to capsules of 2-10%, similar to those reported for *Dendrobium speciosum* (Adams 1982). Discovering pollinators of *D. kingianum* has proved to be extremely difficult, and pollination has not been reported. Over several seasons we have watched several species of native and introduced bees foraging among colonies of *D. kingianum.* Although visiting bees removed pollinia, the full sequence of pollination was not seen.

In the flowering season of 1985, we observed, unexpectedly, the repeated pollination of *D. kingianum* in a Melbourne private collection of Australian orchids. Identification of the responsible insect indicated it is likely to be a significant pollinator in the natural habitat.

Description of Pollination Events

The early afternoon of the 6th October 1985 was warm (24 °C) and sunny with a light breeze. Several very active bees were noted to be hovering around a group of *D. kingianum* plants in the open air. These clones originated from the Buckets near Gloucester, NSW and bore large, open flowers (petal span 35mm, labellum 8mm wide by 15mm long). All flowers had intact anther caps with pollinia in place, and had not been pollinated. An intense fragrance was evident on examining the flowers. Several bees were visiting a range of colour forms — white, pink and pink-red. The following sequence was observed several times.

An unbanded dark brown bee landed on the tip of the labellum, and moved into the flower by crawling down the concavity formed by the well-developed lateral labellar lobes. A raised green, pink or yellow linear callus on the midlobe may serve as a guide. The hinged labellum moved up and down with the activity of the insect, allowing its head to reach near the foot of the curved column. A few seconds after entering, the bee reversed, knocking back the anther cap and causing the pollinia to eject onto the dorsal thorax, where they attached to hairs midway between the wings.

The bee moved to a flower on an adjacent plant, again landing on the labellum and pushing deeply into the flower. In this position the thorax formed a close fit with surrounding floral parts and the pollinia were pressed firmly into the recessed cavity of the stigma. As the bee emerged from the flower, the pollinia dislodged and were reattached to the sticky stigmatic surface.

The activity of pollinating bees was apparently random with visits to flowers of various ages, and pollinia transfers both within and between plants. After five minutes of intense pollinating activity, they left the area, having visited and disturbed pollinia on approximately a third of the open flowers.

Identification of Pollinator. The bee was identified by Dr Ken Walker of the Museum of Victoria as a small variant of the introduced or common honey bee *Apis mellifera.*

Results of Pollination. Post pollination closure of flowers occurred after one day, and seed pods developed on some pollinated flowers. Seed was liberated when the capsules dehisced in mid January 1986.

Discussion

The Floral Display of *D. kingianum*: *D. kingianum* presents a variable floral display to potential pollinators. Plants may be short, medium or tall caned; and scattered infrequently, or densely grouped into large colonies covering broad rock faces. Over a range of localities, flowers vary, from sparse and small on drooping racemes, to large and well presented on erect racemes forming mass displays. The colour spectrum is from white through pink shades to deep red. Flowers open sequentially and usually endure for one or two weeks, depending on weather conditions, especially temperature.

The most impressive floral displays are seen in consistently warm conditions and are associated with intense fragrance and a short longevity of individual flowers. This flowering pattern, termed the "big bang" effect (Gentry 1974) is seen in a number of Australian orchids, for example, *Sarcochilus moorei* and *Dendrobium speciosum,* and is a potent stimulus to potential insect pollinators. In cooler conditions the flowering season is longer at the expense of a mass display. Low frequencies of fruit set may be partially explained by weather conditions that are unfavourable for fragrance emission and insect activity. Fruit set is also kept infrequent by self-incompatability of most *D. kingianum* clones (Adams, in preparation), which means that pollinia transfers between flowers on the same plant do not result in capsules.

Fragrance emission is highly temperature dependant, and appears to be the most significant factor in promoting insect activity. The ideal conditions for intense fragrance and pollination occur during the midperiod of warm sunny days with slight breeze.

Flowers of *D. kingianum* do not produce appreciable amounts of nectar, and offer no apparent reward to insect visitors. This is another example of pollination by deceit, as described in several Australian orchid genera (Coleman 1927, Bates 1985 Beardsell 1986).

Pollination by *Apis mellifera:* The complete pollination sequence by *Apis mellifera* has been observed and we consider that this bee is an effective and likely common pollinator of *D. kingianum* in the natural habitat. It is now widely distributed over the entire range of Eastern Australian orchids, in both feral and commercial bee populations managed by apiarists. Other orchids with floral structure that would allow pollination by *Apis mellifera* include large flowering *D.* x *delicatum, D. speciosum* var. *speciosum,* and *D. tetragonum.*

The smaller variants of *Apis mellifera* are able to pollinate larger flowering clones of *D. kingianum,* but they are too large to enter the many smaller flowering natural clones. The most likely pollinators for small flowers are species of native social bees. When *Apis mellifera* visits flowers with narrow floral tubes, such as *D. speciosum* var. *hillii,* they cannot enter and often knock pollinia to the ground in the struggle (T. Slater, pers. comm.).

Many earlier reports of pollination in *Dendrobium* and other Australian orchids presume pollinator status after incomplete observation of visits to flowers and removal of pollinia. Reports of visits of *Trigona* bees to *D. speciosum* (Smythe 1970) and of the yellow honeyeater (*Meliphaga flava*) to *D. smilliae* (Smythe 1970) provide no more than a suggestion that these vectors are actual pollinators. The landmark description of pseudocopulation of *Cryptostylis leptochila* by Edith Coleman (Coleman 1927) meets the criteria of pollen removal and effective transfer that are required to conclude that pollination has occurred.

A literature research reveals few satisfactory descriptions of pollination in Australian *Dendrobium* species. All reports indicate native bee pollinators. Jones and Gray attributed pollination in *D. lichenastrum* to *Trigona* bees (1976) and described pollination of *D. ruppianum* by bees of the genus *Homalictus* (1977). Two species of tiny bees of the genus *Euryglossina* have been observed to pollinate *D. linguiforme* (Jones 1974).

Unfortunately it has been extremely difficult to observe full pollination events in the natural habitat, despite concerted efforts, and we are still to discover the pollinators of most common Australian orchids. The destruction of habitat of orchids like *D. kingianum* is regrettably still proceeding, further hampering pollination study, by removal of plants, and by associated reduction of the fragrance emission that attracts insect vectors.

References

Adams, P.B. and Calder D.M. (1982) Flowering, pollination and culture of *Dendrobium speciosum* Sm. J. Orch. Species Soc. Vic. **1:** 6-11.

Bates, R. (1985) Dishonesty and deceit in the pollination of Australian orchids. Orchadian **8:** 112-113.

Beardsell, D.V., Clements M.A., Hutchinsn J.F. and Williams E.G. (1986) Pollination of *Diuris maculata* R.Br. (Orchidaceae) by floral mimicry of the native legumes *Daviesia* spp. and *Pultanaea scabra R.Br.* Aust. J. Bot. **34:** 165-173.

Coleman, E. (1927) Pollination of the orchid *Cryptostlis leptochila*. Vic. Nat. 44: 20-23.

Jones, D.L. (1974) The pollination of *Dendrobium linguiforme* Aust. Orch. Review 39: 70-72.

Jones, D.L. and Gray B. (1976) The pollination of *Dendrobium lichenastrum* (F. Muell.) Krzl. Bull. Am. Orch. Soc. **45:** 981-983.

Jones, D.L. and Gray B. (1977) The pollination of *Dendrobium ruppianum* A.D. Hawkes. Bull. Am. Orch. Soc. 46: 54-57.

Smythe, R. (1970) *Dendrobium smilliae* — Australia's first bird pollinated orchid. Orchadian **3:**93.

Smythe, R. (1970) A pollinator for *Dendrobium speciosum* Orchadian **3:** 119.

***Botany School**
University of Melbourne

Growing *Dendrobium tangerinum* in Queensland

by M. Purnell

***Dendrobium tangerinum* is an attractive species of *Dendrobium* section *Spatulata* (syn section *Ceratobium*), native to a very limited area of New Guinea, with a history of confusion as to its true identity that persists in some circles to this day.**

Rumour has it that a plant was posted to a Queensland grower, by a soldier serving in New Guinea in the early 1940's during World War II. It was "dubbed" by her as *D. tangerine* for its colour; that of a ripe tangerine, and proved so hardy and ready to breed with a wide range of dendrobiums that by the mid 1960's (to quote Andree Millar in March 1967, Australian Orchid Review) "almost every orchid magazine circulating in Australia has a cross using *Dendrobium* 'Tangerine' as a parent. There will be some first class confusion when we do publish a name on this species".

This proved to be a gross understatement. After a great deal of dissention, in 1966 Harvard Botanical Museum in America identified the species as *D. strebloceras* which caused a furore in the orchid world.

I notice Dr Phillip Cribb in his latest book "The Antelope Orchids" states that the specimen sent to Oakes Ames Herbarium for identification was named as *D. strepsiceros* (not *D. strebloceras*) in 1967 but these names did not gain universal acceptance, and the plant was still regarded as *D.* tangerine.

By my records, it was quoted and named as being *D. strebloceras* in 1966. Eventually the name *D. tangerinum* was accepted in 1980, so all hybrids registered as crosses of *D. strebloceras* in that period from 1966 to 1980 are, in reality, *D. tangerinum* hybrids.

Personally, I have never understood how or why it was ever identified as *strepsiceros*, native of the Moluccas, and to quote Professor Eric Holttum in his book "Flora of Malaya Vol. 1 Orchids" "this species (*D. strepsiceros*)...light yellow-green, the sepals with brownish markings; . . . petals erect, narrow, . . . ; lip with five white violet-streaked keels, . . . side lobes rounded, warty inside, light green veined with dark violet; . . . A white flowered variety flowers freely in Singapore. Its origin is unknown." By colour slides it looks more like *D. stratiotes* in colour, shape and form.

Then, *D. strebloceras*, again to quote Professor Holttum, "Native to Halmaheira; not common in cultivation, flowers fairly freely in Singapore."

Stems to 100cm or more long, inflorescence 30-40cm long with about 10 flowers, 5cm high, fragrant. Sepals and petals yellowish with dark purple-brown streaks, lip with 5 white violet-bordered keels, side lobes light yellowish with violet veins, midlobe white with violet edge and a few violet markings. Again, by colour slides, this is an apt description of *D. strebloceras* and certainly not of *D. tangerinum,* and I fail to see how any experienced orchidologist could make such a glaring mistake at all.

D. tangerinum has canes up to 100cm tall at most, distinctive with a dark ring round each internode, stems tapering to a thinnish base and are sometimes streaked with brown purple lines. The inflorescence has 10-12 flowers, fragrant, with sepals and petals a shining orange-tangerine with light purple-brown streaks. Petals are erect with 3.5 twists, 4cm tall, sepals a little paler, curling sharply back and under, with undulated edges. The lip has 5 faint keels, flushed and veined in violet, the mid-lobe ends in an abrupt point, after widening from a narrow base. (The violet flushed lip is carried into many tangerinum hybrids).

I notice orchid nurseries still persist in advertising *D. strebloceros* and I have personally identified some labelled *D. strebloceras* as really being *D. tangerinum,* without any doubt.

I very much doubt if the true *D. strebloceras* (or *D. strepsiceros*) have ever been in any collection in this country, in my lifetime.

All this confusion is very disappointing as *D. tangerinum* is a most desirable species and produces some hardy and showy hybrids.

I have collected *D. tangerinum* in the Gusap and Kaiapit areas of the Markham Valley outside Lae in New Guinea, and Andree Millar also found it on the cliff faces of the Snake River. Both areas are hot and much drier than the coastal strip and *D. tangerinum* prefers drier conditions in captivity, than other ceratobiums that revel in heat and humidity in summer here.

We found it on trees in native food gardens where odd trees were left to provide shade for babies hung up in string billum bags while Mum got on with the gardening. The trees are very similar to our tall Leichhardt trees that grow mainly along creek banks; the New Guinea variety is not so tall, and has more sparse foliage, but the branches emerge horizontally from the trunk in the same manner. The plants grew on the upper side of the bare branches in full sun, others on the same type of tree bordering the river in a sea of Kunai grass plains, hot dry and in blazing sun; the area receives about 1500mm of rain per year, which is about less than a fourth of coastal rainfall.

At Kaiapit I collected a clone in shadier conditions, but still in a dry atmosphere; it was taller, and thinner with very dark tangerine flowers and vivid violet lip flush.

D. tangerinum has short, thick, dark green leaves and the plant will send out aerial growths very readily if it is too wet or damaged.

It resents being divided and prefers to grow as a specimen plant. Division causes the dormant eyes along the canes to activate and the plant will throw numerous aerials in a rather frantic survival effort to propagate itself.

D. tangerinum makes some lovely hybrids and often reduces the height of the other parent to a more easily handled bench size in its hybrids.

Crossed with *D.* Caesar 'Java' the hybrids bore unusual bright orange-tan flowers with darker tips and violet lips; with D. Caesar 'Redlip' the result was big deep pink intermediates of good size and texture.

Crossed with *D.* Gloucester Charm to make *D.* Tan Charm, which I named for obvious reasons, the hybrids had bright purple flowers with tan horns and violet lips, with thirty two and thirty five smallish vivid flowers on very erect inflorescences.

D. Autumn Lace (syn. with *D.* Maid of Gloucester) is *D. tangerinum* x *D. canaliculatum* with bright yellow flowers, tan horns and vivid red-purple lips and dainty flowers of 10 to 12 to the inflorescence.

D. Pioneer River is *D. lineale* x *D. tangerinum* with long sprays bearing numerous flowers ranging from yellow-to-pinky tans and *D. stratiotes* x *D. tangerinum* made *D.* Stratiotan, creamy white with green horns and violet lip, to pinky tans, and *D.* Luwin Park named for my property in New Guinea is also a prolific flowerer, being *D. tangerinum* x *D. antennatum* and the colours range from white with yellow horns and violet lip to pinks and tans all free flowering with numerous inflorescences and shortish canes easier to handle on the bench.

D. tangerinum, to a greater extent reduces the length of canes in its hybrids. The flowers are mainly smaller than those of the other parent (i.e. using *D. stratiotes* or *D. lasianthera*) and sometimes but not always, the hybrid bears only 12-15 flowers, but has more inflorescences per plant. It appears to intensify the depth of colour too.

D. Ben Purnell is *D. tangerinum* x *D.* Salak 'Brunette' and has lovely dark red bronze flowers and the lilac flushed lip of both parents, with glossy solid textured flowers and throws numerous inflorescences at each flowering.

D. Tan Lass is superb, with bright flowers in orange tan with purple shading, darker tips to the petals and violet lips; not one poor colour flowered so far.

In the first cross I used *D. lasianthera* 'Sepik Blue'; in a second cross, I used *D. lasianthera* 'May River Red' and the latter hybrids which I have not flowered yet, should have darker colours and colour combinations.

D. tangerinum x *D.* Claudia has thin, erect dark tan petals flushed with purple, white sepals veined in purple and a dark purple veined lip and registered as *D.* Pioneer Tan. *D.* Pioneer Tankela is *D.* Kakela x *D. tangerinum* with bright red bronze petals, with darker tips and sepals striped red brown, with yellow margins.

I must confess I have used *D. tangerinum* in a lot of secondary and further hybrids; often these previous crosses are unregistered and one has to try and find out just when and where and by whom these were crossed, and obtain permission to register all those crosses before finally registering one's own, and this can be a very expensive undertaking.

I have found making primary and secondary crosses with *D. tangerinum* more satisfying, as the *D. tangerinum* influence is not lost among the characteristics of a welter of other parents in complicated crosses.

The orchid world has to thank this attractive New Guinea species for some really striking flowers that have been produced, using it either as a pod or pollen parent with equal success.

6 Holmes Drive,
Beaconsfield,
June 1987 Mackay North, 4740.

NOTICE

Professor Joseph Arditti is planning to revise and update his manual of orchid tissue culture propagation and requests researchers to send him reprints or photocopies of their publications on this and related topics. If possible articles in other languages should be accompanied by an English summary. Prof. Arditti hopes to illustrate the revision and would appreciate 2-3 copies of illustrated reprints since this will allow him to cut and remount some illustrations. The address is:

Prof. Joseph Arditti
Department of Development and Cell Biology
University of California Irvine, CA 92717 USA

From the Back of the Bushhouse

by Walter T. Upton

Bill Lavarack picked up the gauntlet I threw down at him and had "the first go" at what we hope will be a regular column. Now I feel guilty, so I am compelled to have "the second go". Seriously, when I told Bill his idea was a good one, I meant it; after all, we all want to know what is happening in the other persons backyard.

Over the years, things at the back of my bushhouse (the Sydney area) have changed considerably. When we founded A.N.O.S. in the early 60's, the native orchids grown here were mostly the more common *Dendrobium* species, *D. speciosum, D. kingianum, D. teretifolium, D. gracilicaule.* A few *Sarcochilus* species, *S. hartmannii, S. falcatus, S. ceciliae.* An occasional *Cymbidium suave* and *Pterostylis baptistii.*

The native class in the shows were mostly won by a plant of *Dendrobium speciosum* or *D. kingianum* with a large and well filled pot of *Pterostylis baptistii* occasionally beating them. The few of us that had large and varied native collections were considered to be something between authorities and native cranks, (I don't know what you can see in those little things!) Hybrids were only just beginning to appear; mostly only inferior forms of *Dendrobium* Ellen, *D.* Bardo Rose, *D. x delicatum* and *D. x gracillimum* and *Sarcochilus* Fitzhart.

Today, I am glad to say, things are much different. Hundreds of good native collections and a far more intelligent approach to the hobby. A very large percentage of the epiphytic species are to be seen throughout the year and terrestrials are becoming more and more popular.

At the July meeting of A.N.O.S. Sydney Group, there were numerous terrestrials, and of many genera, *Pterostylis, Corybas, Acianthus, Glossodia, Diuris* to name a few, at least six different *Pterostylis* hybrids.

The Wollongong and District Group have a special Terrestrial Study Group and are currently considering inviting Warringah and Sydney Groups to participate; also to hold a joint field trip.

When one looks around at native orchid group meetings today, it is quite apparent that more young persons are involved, mostly the more studious and serious minded. There is much depth of discussion both by educated and experienced members which leads to a great wealth of knowledge and intensifies the enjoyment of our hobby.

A large number of books on native orchids, giving instant knowledge, are available today, leaving more time to evaluate and progress our scientific approach to native orchids. In the late 1950's early 60's very few, if any, books, and only a couple of periodicals were readily available, making it necessary to assemble our own facts and figures. This was very exciting as, in a way, we were pioneers, giving added impetus to our enthusiasm to spread our gradually achieved knowledge of our native orchids. Now that the everyday knowledge is readily available, the desire is to delve to the limits of our hobby.

There are numerous annual shows today at which only native orchids are displayed. Warringah Group this year presents its Thirteenth Annual Spring Show at Mona Vale and there are no less than 31 classes and 5 championships. Over the two days of the show the hall is usually packed with enthusiasts.

Sydney Group, this year, is holding three shows, a winter show and two spring shows, the last one being in October, so that the genus *Sarcochilus* can be to the fore.

Whilst on shows, an important happening this year — A.N.O.S. judges will participate in the judging of the native orchid classes of the Orchid Society of N.S.W. Spring Show in the Sydney Botanic Gardens.

Hybridising is becoming more and more popular, with many hobbyists producing their own flasks and seedlings. Regretably the standard is not very high; the parents are not always of good quality. If two plants are in flower, they are crossed without thought to the progeny.

In the list of new registrations of Australian Native Orchid Hybrids (shown elsewhere in this issue) taken from the Orchid Review from January to July this year, there are 30 new hybrids by 10 different hybridisers. Comparing this with the early years, it is far more than the total native hybrids produced before 1960 and most of those hybrids were produced by overseas hybridists.

The weather in the Sydney area this winter, has in my opinion been quite abnormal. In general terms, it has been quite dry with a few long rainy periods. Not a cold winter, although there have been a few cold snaps. The result in my bushhouses is that the natives, in many instances, are flowering early.

A large number of *Dendrobium speciosum* will be opening their first flowers by the second week in August, unless we get another cold snap. *Sarcochilus* racemes are also well advanced. Many hybrids are already in flower (July 21st) and the first indications are that we are going to have a good flowering this year.

Late autumn and winter has produced many flowers from *Dendrobium* Peewee and similar type crosses. It is not too far into the future when our natives will be flowering in the bushhouse all through the year. I never have less than 40 plants in flower at any one time, mostly hybrids having *Dendrobium tetragonum* and a small percentage of *D. bigibbum* in their background during the winter months.

You will have noticed in my article in the last Orchadian "A.N.O.S. Update", that I listed the first four new Editorial Associates for the Orchadian. Since then 3 more knowledgeable persons have accepted the position; they are: Dr Kingsley W. Dixon, Research Botanist at the King's Park and Botanical Gardens, Western Australia, Clyde R. Dunlop, Conservation Commission of the Northern Territory, Darwin; David L. Jones, the well-known author of many papers and books on native plants, Queensland.

AUSTRALIAN NATIVE ORCHID HYBRIDS

(New registrations by the R.H.S. from lists in the Orchid Review January — July 1987)

NAME	PARENTAGE	REGISTERED BY
Dendrobium		
Amaroo	*tenuissimum* X *falcorostrum*	C. Brandon
Amber	Peter X *tetragonum*	D. & M. Crawford
Aquarius	Bardo Rose X Star of Gold	R. Harris
Collette Fleur Simpson	*canaliculatum* X *monophyllum*	S. Simpson
Colsboys	Jamie Upton X John Upton	W.T. Upton
Delemma	Emma X Specio-kingianum	W.T. Upton
Ella Rose	Ella Victoria Leaney X Blushing Rose	W.T. Upton
Gracia	*gracilicaule* X *adae*	J. Hurst
Green Goddess	*adae* X Susan	W.T. Upton
Green Star	Jamie Upton X Golden Fleck	W.T. Upton
John Rose	John Upton X Bardo Rose	W.T. Upton
King Goblin	Goblin X *kingianum*	W.T. Upton
Kookaburra	Star of Gold X Ellen	C. Brandon
Lemon Glow	Jamie Upton X *speciosum*	W.T. Upton
Liela Gilbert	*gracilicaule* X *aemulum*	J. Donovan
Lorikeet	Peewee X Ellen	W.T. Upton
Omega	Tully X Carawah	C. Brandon
Pauline Rankin	Hilda Poxon X *tetragonum*	R. Rankin
Penny Rose	Penny Ann X Bardo Rose	W.T. Upton
Ring of Fire	Ku-Ring-Gai X John Upton	W.T. Upton
Super Ruffles	Rosemary Jupp X *tenuissimum*	R. Harris
Tarantula	Allyn Star X *tetragonum*	W. Skillicorn
Whitehart	Nunkumbil X *adae*	W.T. Upton
Zip	Ku-Ring-Gai X *kingianum*	W. Skillicorn
Sarcochilus		
Elizabeth	Lois X *fitzgeraldii*	I & E Whitcombe (R. Deane)
Leone	Melba X *olivaceus*	W.T. Upton
Long Star	Southern Cross X *hartmannii*	R. Harris
Melody	Melba X *fitzgeraldii*	W.T. Upton
Pinky	Mavis X *hartmannii*	W. Skillicorn
Sandon Rose	Elizabeth X *hartmannii*	I. & E. Whitcombe

Caladenia stricta (R. Bates) R. Bates

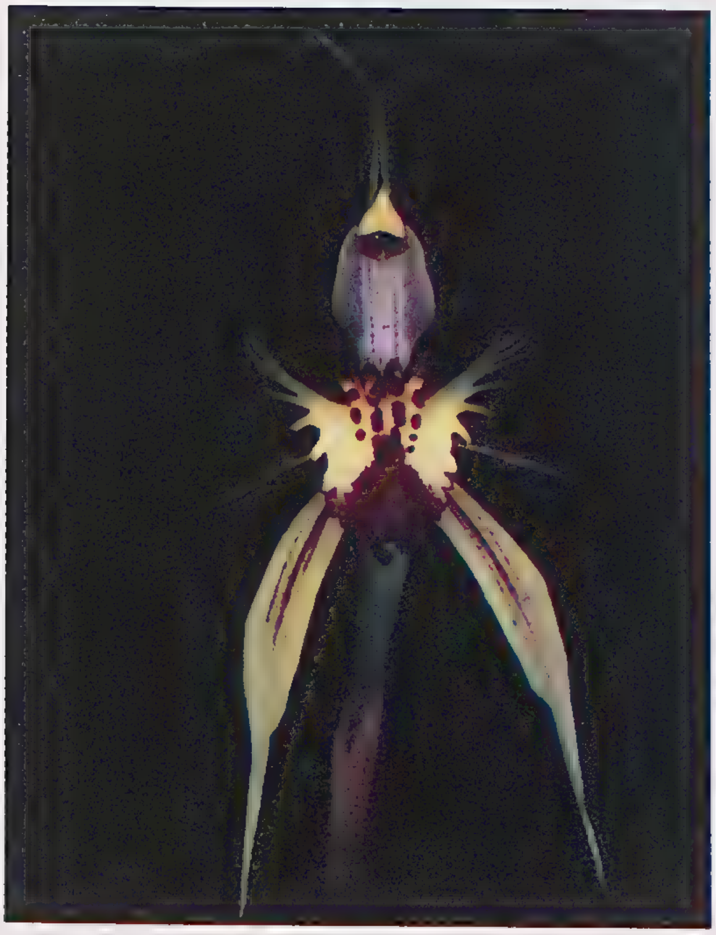


Fig. 1 *Caladenia stricta* from Yorke Peninsula, S. Australia. Front view showing yellow and red calli and non-clubbed sepals.

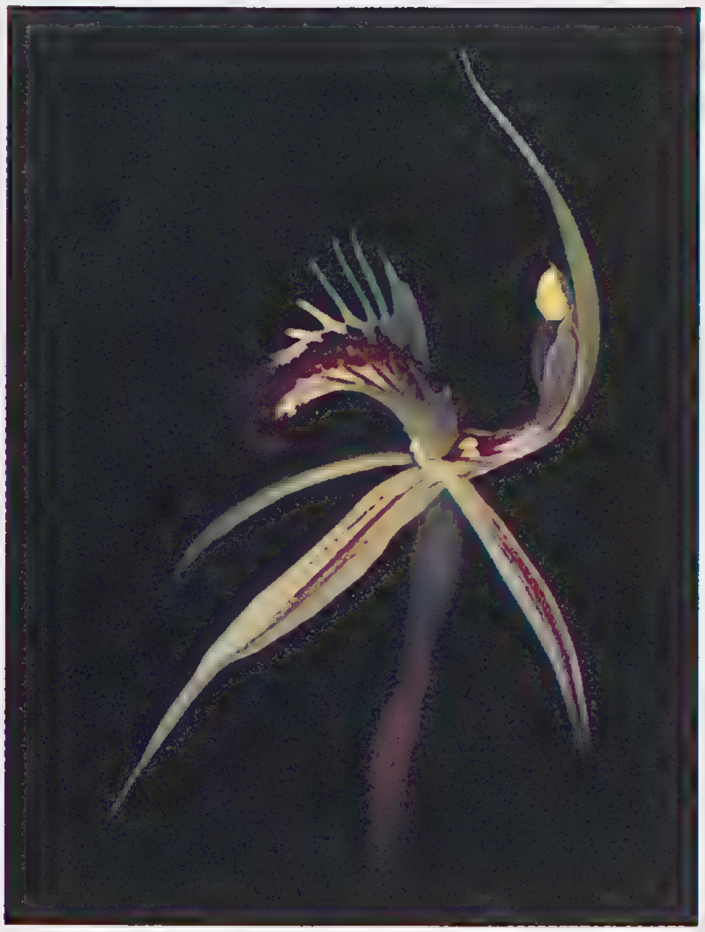


Fig. 2 *Caladenia stricta*, side view.

Photos by R. Bates

Pollination of *Dendrobium linguiforme*

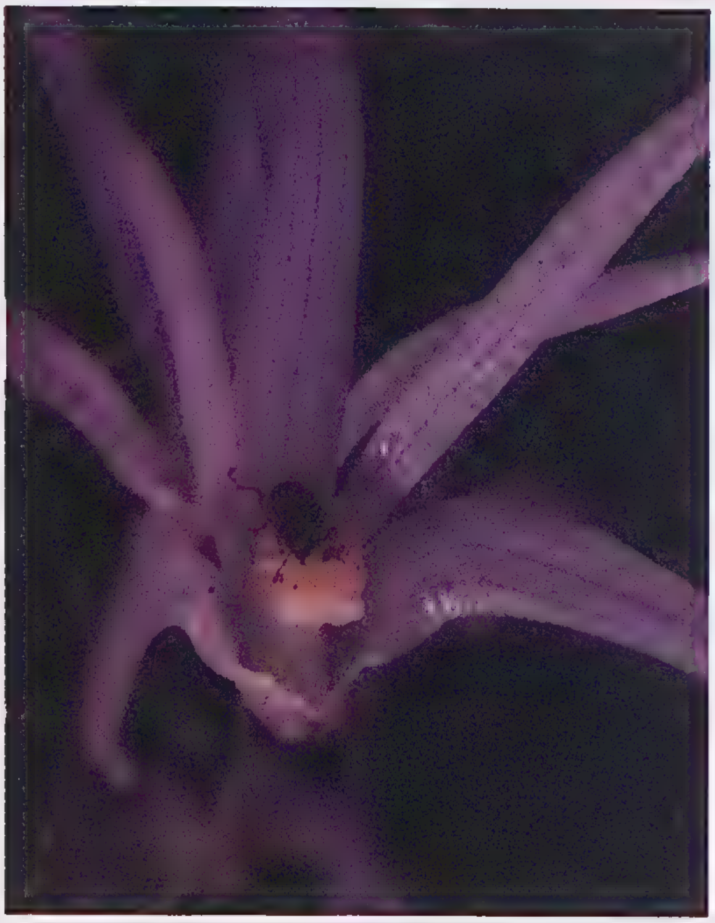


Fig. 3 *Dendrobium linguiforme* with the weevil *Cyttalia sydneyensis* bearing a pollinarium.

Photo by P. Lister

Two New Hybrids

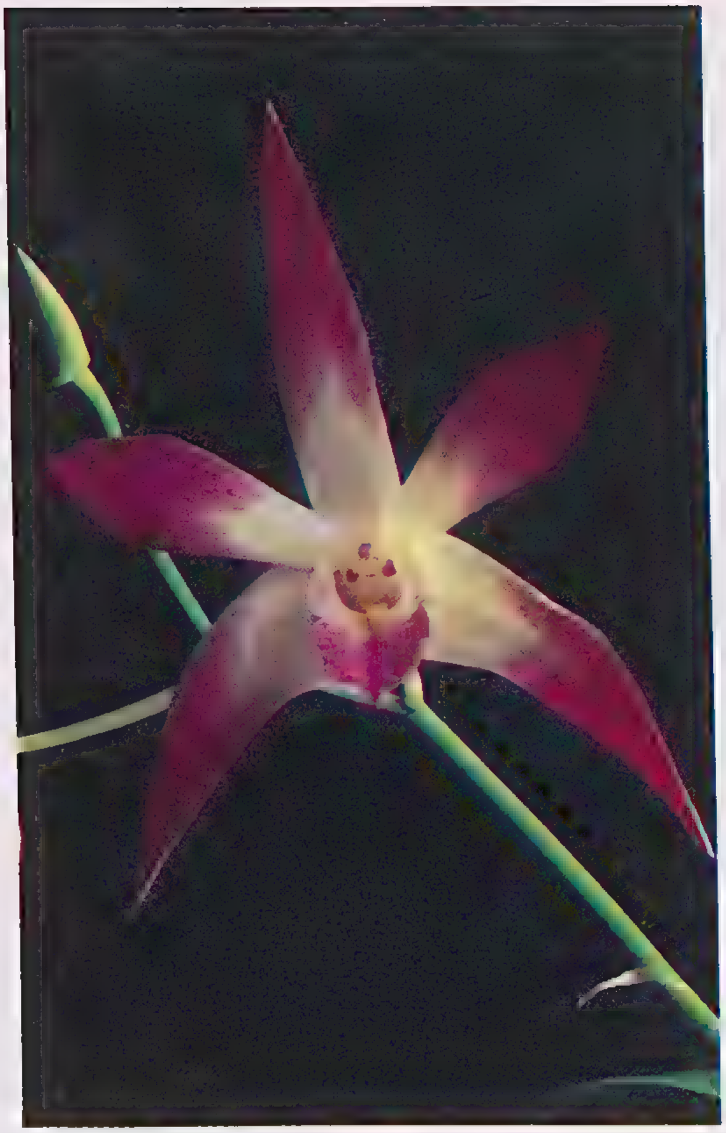


Fig. 4 *Dendrobium* Elegant Heart. These two recently registered hybrids by W. T. Upton are fine examples of the hybridist's art.

Photos by W. T. Upton

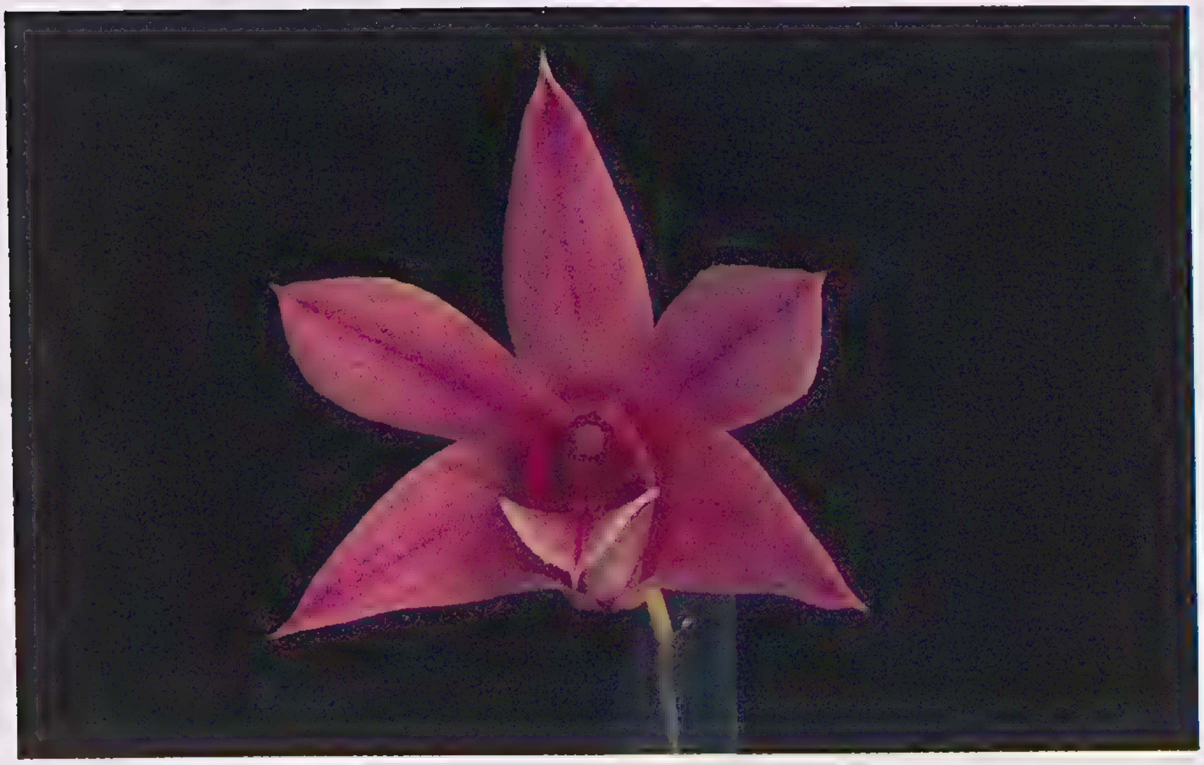


Fig. 5 *Dendrobium* Big Fleck.

Observations on the Pollination of *Dendrobium linguiforme* Sw.

by Peter Lister

Abstract: Previous recordings of the pollination of *Dendrobium linguiforme* Sw. suggest a lack of pollinator specificity. This paper confirms this to be the case and also records a *Coleopterous* pollinating vector previously unrecorded.

Background Information:

Tribe	*Epidendreae*
Subtribe	*Dendrobiinae*
Genus	*Dendrobium*
Subgenus	*Athecebium*
Section	*Rhizobium* [1]

Dendrobium Sw., Nov. Act. Soc. Sc. Upsal. vi(1799)82. [2]

Dendrobium linguaeforme Sw., Vet. Acad. Handl. Stockh. xxi(1800)247 [2]

In 1799, Professor Olof Peter Swartz [3] (b.Norrkoping 21.Sept. 1760 - d. Stockholm 19.Sept.1818) [4] created and described the genus *Dendrobium* in Nova Acta Regiae Societatis Scientiarum Upsaliensis. In the following year he named and described, in Kongliga Svenska Vetenskapakademiens Handlinga Nya foljd, Australia's first *Dendrobium* as *D. linguaeforme* Sw..

The genus now comprises some 1400 species distributed throughout tropical Asia and Australasia.[5]. *D. linguiforme* Sw. belongs to the Section *Rhizobium* — the 'fleshy' leaved, rhizomatous species endemic to Australia and New Guinea. It has two recognized varieties namely, var. *linguiforme* and var. *nugentii,* the former occurring naturally from Narooma in southern NSW to south of the Burdekin River in north Queensland, while the latter is restricted to the area between the Endeavour and Burdekin Rivers in north Queensland. This paper therefore concerns the var. *linguiforme* as the observations detailed below were made within the Sydney region.

D. linguiforme is an epiphyte on either trees or rocks and within the Sydney area is often locally abundant as a lithophyte on Hawkesbury sandstone. In some situations it covers large areas of exposed sandstone in sympatry with various mosses, liverworts and lichens. Examples of these are: *Dicnemoloma pallidum* (Hook.) Wijk et Marg., *Frullania* spp., *Parmelia* spp., *Sphaerophorus* spp.

Observations were made in a north-western suburb of Sydney, of a single naturally occurring plant on sandstone, situated in open forest vegetation at an altitude of 50m with an easterly aspect. This very narrow tract of bushland (approx. 80m wide) is bordered on the northern and southern sides by residential and light industrial zones respectively.

Flora in the immediate vicinity comprise the following species:

Pteridium esculentum (Forst.f) Cockayne.
Asplenium flabellifolium Cav.
Podocarpus spinulosus (Sm.)R.Br. ex Mirb.
Gonocarpus teucrioides DC.
Banksia serrata L.f
Grevillea linearifolia (Cav.) Druce
Persoonia levis (Cav.) Domin.
P. pinifolia R.Br.
Xylomelum pyriforme (Gaertn.) Knight
Billardiera scandens Sm.
Elaeocarpus reticulatus Sm.
Amperea xiphoclada (Sieb. ex Sprengl.) Druce
Micrantheum ericoides Desf.
Phyllanthus thymoides J. Muell.
Ceratopetalum gummiferum Sm.
Dillwynia retorta (Wendl.) Druce var. *retorta*
Pultenaea flexilis Sm.
Angophora costata (Gaertn.) J. Britt. ssp. *costata*
Austromyrtus tenuifolia (Sm.) Burrett
Eucalyptus pilularis Sm.
E. piperita Sm. ssp. *piperita*
Kunzea ambigua (Sm.) Druce
Syncarpia glomulifera (Sm.) Niedenzu
Allocasuarina littoralis (Salisb.) L.A.S. Johnson
Boronia ledifolia (Vent.) J.Gray
Polyscias sambucifolia (Sieb. ex DC) Harms
Platysace lanceolata (Labill.) Druce
Xanthosia pilosa Rudge
X. tridentata DC
Pratia purpurascens (R.Br.) E.Wimm.
Lomandra longifolia Labill.
Xanthorrhoea resinosa Pers. ssp. *concava* A.T. Lee
Calochilus robertsonii R.Br.
Entolasia marginata (R.Br) Hughes

Observations: Sunday 5th October 1986: While photographing the plant in full flower, two tiny weevils were seen. One flew from its resting position on a petal apex and did not return, while the other appeared to be quite prepared to stay, as long as I kept my camera lens at a distance. Attached to the back of the insect was a pollinarium from *D. linguiforme* Sw.

Several photographs were taken but unfortunately, battery power to my flash was coming to an untimely end.

After the inevitable power failure, I stayed for quite some time, following the weevil's surprisingly fast movements over the inflorescences. These insects appear to have extremely good vision, moving away rapidly at any approach, often to the back of the flower or huddling between the perianth segments and column. It seemed to be attracted to the labellum, manipulating the calli ridges with its mouthparts and making its way into the flower, but each time withdrawing, as I moved too close. I collected it with the pollinarium attached in order to have an identification made, keeping it in an empty film container with a single *D. linguiforme* Sw. flower.

Monday 6th: I returned to the site at 7 a.m., finding a weevil resting in a *D. linguiforme* Sw. flower. Being quite cool, its movements were at a minimum, but by 9 a.m. it was actively exploring the sunlight-flecked flowers. It bore no pollinaria, and was at this stage seemingly disinterested in entering flowers. From its behaviour it appeared to dislike my presence and possibly was the same one that flew away the previous day. I returned home, and upon examination of the captured weevil, found that it no longer bore pollinaria. I removed and examined the flower, finding the pollinarium firmly embedded in the stigmatic surface, the weevil having deposited it while I was absent.

Tuesday 7th: Placed the weevil in a glass specimen tube with a fresh flower bearing intact pollinia. At approximately 3 p.m. the weevil entered and withdrew from the flower with the pollinarium adhering to its back as before.

Wednesday 8th: The weevil died at 4.30 p.m. with the pollinaria still attached.

Floral Morphology: The flowers of *D. linguiforme* are produced in numerous, dense racemes. Being a creamy white in colour, they enable a high level of reflectivity of ultraviolet light so being attractive to many insects. The plant under observation covered an area of approximately 0.5 square metres and bore 38 racemes, averaging 11 flowers per raceme. Sepals and petals average about 2cm in length, much larger than the column and labellum, aiding in attracting an insects over some distance. The labellum is articulate on the column foot and bears two erect lateral lobes, the middle lobe recurved and the whole lamina with three sinuous callous ridges. The lateral lobes are usually marked with purple and embrace the column while the midlobe tends to a creamy yellow especially between these ridges, where it appears, under microscopic examination, to consist of highly turgid, almost papillate, glandular cells. The column is reasonably stout in the upper half, bearing narrow wings and a green, sunken stigmatic surface above which is a narrow chisel-edged rostellum. the column apex bears a two-celled clinandrium containing four naked pollinia and protected by an anther cap, clothed heavily in projecting glandular structures. The lower half, as mentioned above, is a well developed column foot, streaked with purple and supporting the labellum. In this lower region a cavity is formed like a nectar but as others have reported, no fluids or any other attractants are apparent. Due to the lateral lobes embracing the column, a tiny tunnel-like passageway is formed leading to this nectary-like region.

The pollinator: The weevil was given to Dr David McAlpine who sent it to the CSIRO Division of Entemology in Canberra. There it was identified by Elwood C. Zimmerman as *Cyttalia sydneyensis* Blackburn, a member of the Subfamily Eugnominae, of the Order Coleoptera (beetles-comprising 28000 spp. in Aust.). It is a highly mobile, pollen feeding weevil found on many plants. It has also been observed by the author on the flowers of *Kunzea ambigua* (Sm.) Druce.

Cyttalia sydneyensis Blackburn is a small weevil (2.5mm), matching in size the 'passageway' described above, created by the proximity of the labellum and column of the orchid. It is a dark brown on the dorsal surface covered with white hairs below. A very active and fast moving insect, it is capable of good flight. The elytra (wing covers) bear several rows of lighter coloured, stiff, backward-pointing hairs.

Pollination: In the past, observations have been made of several insects visiting the flowers of *D. linguiforme* Sw. Gilbert[6] records the Hover Fly *Syrphus viridiceps* as a pollinator and notes visitations by Ichneumonid and Thynnid wasps and small Coleoptera. Jones[7] records the bees, *Euryglossina hypochroma* Cockerell and *E. lynettae* Rayment, as pollinators, and Dressler[5] mentions bees, syrphid flies and thynnid wasps as insect pollinators of *Dendrobium.*

As mentioned earlier, and also by Jones[7], floral attraction is probably due to a combination of scent and sight. The production of perfume is well known in *D. linguiforme* Sw., the sweet scent indicative of fresh food rewards ie.

nectar or pollen for any fortunate insect within range, and the massed, highly reflective flowers for visual cues.

Attraction on the flower to provide enticement to enter is obscure, although a scent undetectable to humans is a possibility. In the case of *Cyttalia,* the yellowish, granular tissue of the labellum maybe an attractant, alluding to something pollenaceous and possibly secreting something upon manipulation by the insect's mouthparts (see observations).

If reference to the drawings is made, it will be seen that the labellum reflects closely, the shape of the column. As the weevil withdraws from the flower (backwards) the backward-pointing hairs receive glue from the rostellum, catch the projections of the anther cap, dislodging it and glueing the pollinarium onto the insect's elytra. Upon the same activity in another flower, the weevil reaches a point on the labellum opposite the stigma where the central portion of the labellum lamina straightens out. At this point, the pollinarium is caught on the chisel-like lower edge of the rostellum, creating a levering effect. This activity and any further agitation will prise the pollinarium from the weevil's back and push it firmly into the stigmatic surface.

The tiny tunnel-like passageway provided by the orchid allows only very small insects to enter with little difficulty but the articulation of the labellum is such that some larger insects (eg. wasps) could also visit these flowers and so rule out pollinator specificity.

Conclusion: It can be seen that the design of the flowers of *D. linguiforme* Sw. allow it to utilize a number of different insects for allophilic pollination. With certainty we can list the pollinators and their respective pollination syndromes as:

Syrphus viridiceps	Myophily	Gilbert (1958)
Euryglossina hypochroma	Melittophily	Jones (1974)
E. lynettae	Melittophily	Jones (1974)
Cyttalia sydneyensis	Cantharophily	Lister (1986)

There is a chance that we may find more Hymenopterans, Dipterans and Coleopterans responsible for this orchid's pollination. Unfortunately, during the period of observation covered in this paper, only three weevils were seen, one of which may have been sighted twice on successive days. This lack of individuals could be due to a number of factors, amongst these:

1) close proximity to developed residential and industrial areas,
2) the lack of presence of other *D. linguiforme* in the area,
3) the inconspicuous location of the orchid for insects (shaded for most of the afternoon), and
4) observations only made early in the morning prior to peak orchid perfume production and peak temperature for weevil activity.

It is presently planned that more observations shall be made in 1987 of larger populations of *D. linguiforme* Sw. in larger tracts of bushland in the hope of learning more of the activities of *Cyttalia sydneyensis* Blackburn and its relationship with this orchid.

Acknowledgements

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References

[1] Dockrill, A.E. (1969) Australian Indigenous Orchids, Vol. 1.
[2] Index Kewensis, Vol. 1,[1985], reprint 1977.
[3] Draft Index of Author Abbreviations, The Herbarium, Royal Botanic Gardens, Kew, 1980.
[4] Pritzel, G.A., Thesaurus Literaturae Botanicae, reprint 1980.
[5] Dressler, R.A., (1981) The Orchids, Natural History and Classification.
[6] Gilbert, P.A. (1985) American Orchid Society Bulletin. 27, 472-5.
[7] Jones, D.L. (1974) The Pollination of *Dendrobium linguiforme,* Australian Orchid Review.

Peter R. Lister
C/- Science Dept.
Kuring-gai CAE,
PO Box 222,
Lindfield, 2070.

June 1987

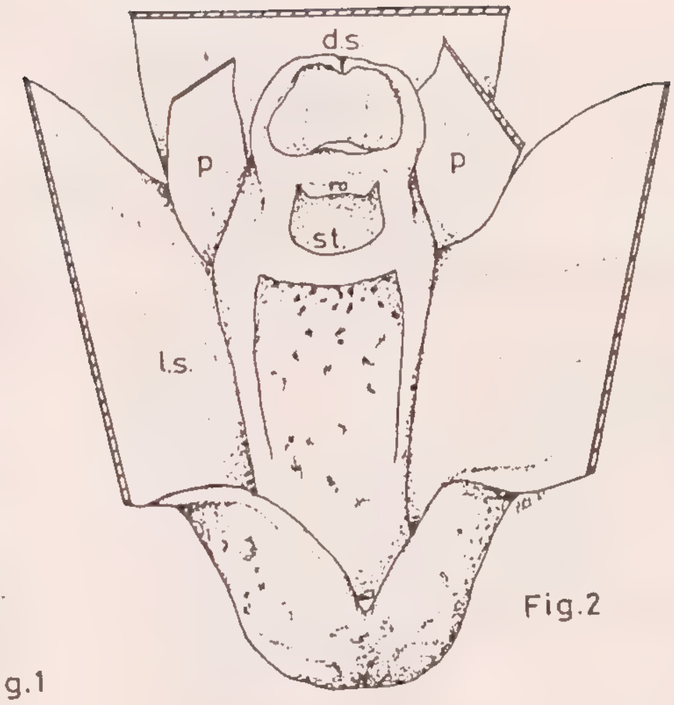

Fig.2

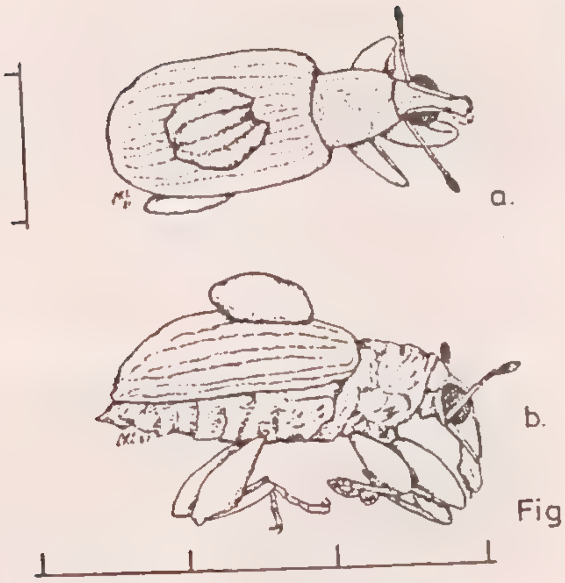

Fig.1

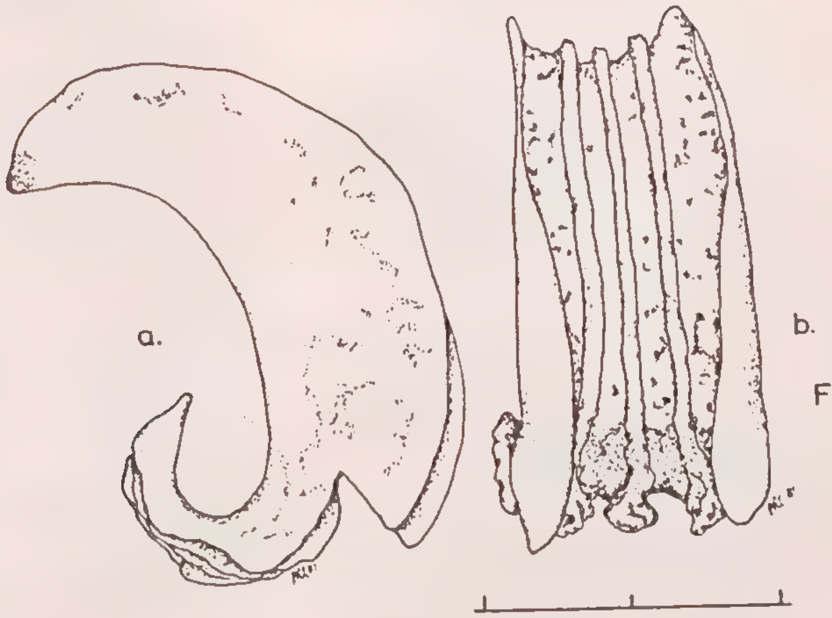

Fig.3

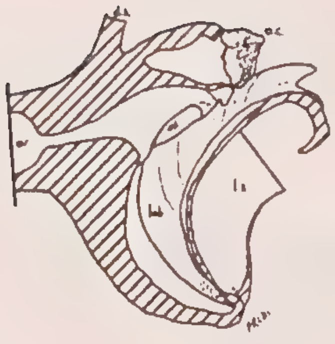

Fig.4

Each Division of SCALE = 1mm.

Fig.1 Cyttalia sydneyensis Blackburn, pollinarium attached.
a. from above X20
b. from side X20

Fig.2 D.linguiforme Sw..Flower with a.c., lab. & pollinarium removed, showing column from front X20.

Fig.3 labellum.
a. from side X20
b. from above X20

Fig.4 L.S. column & labellum X10

d.s.-dorsal sepal, l.s.-lateral sepal, p-petal, a.c.-anther cap, ro.-rostellum, st.-stigma, ov.-ovary, lab.-labellum.

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